University of Washington

ARBORETUM BULLETIN

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Concerning this issue . . .

We bring you a new assortment of reading for your summer pleasure.

Our new Director has written an article on a subject which is of major interest in his research. We inaugurate a new series on "Plantsmen/women of the Pacific Northwest" with one of the greatest and most beloved members of that august company: C. Leo Hitchcock ("Hitchy" to many of you). Especially for gardeners, Brian Mulligan has given you a survey of the old-fashioned wild roses that are becoming new-fashioned. For travelers, the Curator of the VanDusen Garden in Vancouver, BC has described the development of this young but spectacular addition to Vancouver's many attractions. There are more articles on nomenclature, on *Garrya,* on trees of the UW campus and on identification of a cherry there that was mentioned in the last issue.

Concerning the *next* issue: your editor and your editorial board have long been concerned about the scarcity of short articles for gardeners. A few years ago we tried a series called "Vignettes" but gave up when it became too difficult to find authors. After all, you don't want your editor writing most of them, do you? *But* we are going to try again: the series will be called tentatively, "Mistakes I Wish I Hadn't Made (in My Garden)". Even Brian Mulligan says he thinks he can offer a few of those. Make your articles as long or short as you like. Sign them or remain anonymous. But *please* write them!

The list of new Directors and Officers of the Arboretum Foundation, who will have been elected on June 12, and the annual reports will be published next time.

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Rosa brunonii 'La Mortola'

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Photo: Brian O. Mulligan

Effect of Rain and Mist on Plant Growth[1]

H.B. TUKEY, JR.
Director of Arboreta,
University of Washington

Rain means different things to different people. To the farmer, it means water for growth of crops, carrying nutrients up into the stems and foliage. Today we spend much energy collecting water and distributing it through enormous irrigation systems. To the plant pathologist, rain means water for germination of spores, and increased infection by diseases. To the landscape architect, water is an important component of a pleasing design, and the sounds and sights of water in fountains and lakes add beauty to our surroundings. Still other aspects of water include the terrifying power of great storms and the flooding of river basins in the spring.

But there are other effects of rain, more direct effects upon plants, their growth and their distribution. For example, one of the most important actions of rain and mist is the leaching of metabolites from plants (1,7).[2] Mineral nutrients, amino acids, carbohydrates and growth regulators can be washed out of stems and foliage, often in large amounts. Leaching occurs from all types of plants, and the wide range of different metabolites that can be leached makes this an important plant process affecting yield, quality, and pest susceptibility. Substances which are leached from one plant can be reabsorbed by plants growing beneath or nearby with significant effects. For example, inhibitors leached from one plant can completely or partially suppress the germination and growth of other plants nearby. Known as allelopathy (7), this phenomenon is particularly well documented in desert communities but also is known in landscape situations. Junipers make good ground covers due in part to toxic materials which are leached from the juniper foliage and many plants do not grow well beneath the spread of black walnuts. In natural communities, some plants are dependent almost completely for their nutrition upon the materials leached from plants overhead. Thus, the interaction of plants in both landscape and natural conditions is greatly affected by materials which are leached out of the leaves and cycled from one plant to another.

Leaching occurs from cuttings propagated under intermittent mist (1) and it is a common practice for some plant propagators to add nutrients through the mist to those cuttings susceptible to leaching. Nutrient mist applications also provide nutrients for the new growth that occurs under intermittent mist (8). Thus, leaching of metabolites is an important process by which rain and mist affect the development of plants.

Another interesting effect of mist is on the development of dormancy in woody plants (2,6). Normally, woody plants such as *Euonymus alatus* begin preparation for winter in mid-summer. Growth slows, sugars accumulate, leaves turn red and abscise in the autumn, and the plant becomes dormant, requiring about six weeks of low temperatures to resume growth. However, when *Euonymus* plants were grown under intermittent mist during the late summer and early fall, they did not become dormant and the leaves neither became red nor abscised. Instead, leaves remained green and plants continued to grow through the winter season if high temperatures were maintained. In fact, the plants did not become dormant for periods of up to two years if kept under the mist. However, when the plants were remov-

[1]Taken from Proc. Intern. Plant Propagators Soc. 25:403-406. 1975.

[2]Numbers in parentheses refer to numbered references at the end of the article.

ed from the mist, they immediately responded as if it were the fall of the year; red foliage developed, the leaves abscised, and the plants became dormant, even if this occurred during the middle of summer.

Since the growth-regulating chemical abscisic acid (ABA) has been correlated with dormancy in many woody plants, we determined levels of ABA in both the misted and non-misted *Euonymus* (2). ABA in non-misted plants increased gradually during the late summer and early fall and then increased rapidly at the time red color was developing and the leaves were abscising. In contrast, in plants under mist, ABA remained at a low level as long as the plants were under the mist, but increased rapidly when the plants were removed from the mist. Further, we detected ABA in the leachates from the misted plants. This suggested that the delay in dormancy was due to leaching of ABA by the mist.

Another example of the effect of rain and mist is in the development of fall color in the foliage of some shade trees and ornamental shrubs (6). The red color which is so prized in the autumn is due to the accumulation of anthocyanin pigments which are derived from sugars stored in the leaves. It was observed that during a rainy autumn the intensity of red colors in maples was not nearly so striking as during a year with less rainfall. This suggested that something having to do with synthesis of anthocyanins might be influenced by the rain, perhaps sugars or some other precursor.

When *Euonymus alatus* plants were grown under mist, anthocyanins did not develop, and the leaves remained green. In control plants grown without mist, anthocyanins developed normally. Analysis of the misted plants showed that levels of sugars, precursors of anthocyanins, were lower in the misted plants than in the non-misted. Further, the metabolism of the misted plants was altered so that colorless leucoanthocyanins were produced rather than the red-colored anthocyanins. Other factors associated with anthocyanin synthesis, such as nutrition and temperature, were not responsible for the observed effects.

Every plant propagator knows the tremendous influence that mist has had on plant propagation. Cuttings of many plants which were previously propagated as hardwood cuttings in the dormant season can now be propagated much more rapidly as softwood or greenwood cuttings during the growing season. Combined with the use of auxins, mist has revolutionized the plant propagation industry.

The success of mist has been attributed to two major factors (3). Mist cools the leaves and stems of cuttings and raises the relative humidity of the air, reducing the vapor pressure gradient between the plant and the outside air, thus reducing transpiration. Cooling of the leaves reduces the rate of respiration which helps to maintain carbohydrate levels in the cuttings. However, there are other effects as our research has shown.

Mist can also have an appreciable effect upon rooting, as we have reported previously (5). When *Euonymus* plants were analyzed for substances associated with rooting, we found that levels of auxins, carbohydrates, enzymes involved in the formation of auxins, rooting cofactors and flavonoid compounds were all much higher in plants and cuttings grown under mist than in plants which did not receive the mist. No wonder that cuttings under mist rooted so much more quickly than did similar cuttings without the mist. Therefore, mist affects rooting not only by cooling leaves and reducing transpiration, but also by leaching substances from the cuttings, and by inducing cuttings to form natural compounds which stimulate the rooting process.

Another effect of rain and mist is in flowering (4). It is commonly observed in the warm humid tropics that plants often flower in relation to rainfall. In the *Chrysanthemum* which is induced to flower by short days, misting the plants can delay flowering if mist occurs before and immediately following the application of short days. In the case of the Japanese morning glory *(Pharbitis nil)* the results are even more striking. If *Pharbitis,* which requires only one short day (one long night) to flower, is grown under intermittent mist, flowering can be completely inhibited regardless of the photoperiod treatment.

Here is another example of how rain and mist can completely change the growth patterns of a plant.

These changes in metabolism of ornamental plants induced by rain and mist can be observed in other crop plants growing throughout the world. For example, in the San Joaquin Valley of California, commercial grape growers use overhead irrigation to reduce the mid-day temperatures during summer. The leaf temperatures are indeed reduced, but in addition, the flowering patterns of the grapes are changed somewhat, the sugar content of the fruit is increased and the resulting wine product is of higher quality. This is important because the use of overhead irrigation to ameliorate environments of crop plants is increasing, including fruit and vegetable crops as well as landscape plants.

In the Pacific Northwest and other fruit regions, fruit crops are being grown in closely planted hedgerows with overhead irrigation. Large increases in both production and quality have been noted as compared with plants without overhead irrigation. Tea of high quality is produced in areas of India where mist and fog are prevalent; leaching by the mist is recognized as an important factor. Gardeners and nurserymen comment on the luxuriant growth of woody plants in areas with rain and mist, such as the British Isles or the Pacific Northwest. In the warm humid tropics, lush plant growth is often associated with the high temperatures. However, if those same tropical plants are grown at high temperatures but without the constant bathing of the rain, growth does not occur to the same degree.

Thus, mist and rain affect plants by cooling the leaves and reducing transpiration and respiration, by leaching of substances, and by influencing the development of fall color, root initiation and development, dormancy, and flowering. All of these are good examples of how a research interest in ornamental horticulture can have appreciable implications throughout the world, in production of economic plants and in natural plant communities. Rain and mist assume even greater significance as factors in plant growth and development.

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Enjoy Spring Twice This Year—Join the

New Zealand Horticultural Tour

with Joe Witt, Curator, UW Arboretum

October 17 to November 8, 1980

Sponsored by the UW College of Forest Resources and Arboretum

Visit the rhododendron garden of Pukieti and the Duncan and Davies Nursery; go for bush walks with experts on indigenous flora; see beautiful Mt. Cook and Milford Sound, Christchurch and much more.

$2600 price includes round trip air fare. Group size is limited to 30. To obtain the itinerary and registration information, call the Forest Resources Continuing Education Office at 545-1373.

President's Message

There is mostly good news to report to you. (The retiring chief of any group likes to emphasize that.)

The Tea House in the Japanese Garden is being rebuilt. The fund raising is nearly complete, with contributions still being received every day. Funds already in hand permit construction to begin: a building permit has been secured; a protective temporary fence is being installed; and material is already being stockpiled. The actual rebuilding will probably have already started when you read this. There are security guards in the Garden daily, provided by the City of Seattle. An electronic security system will be installed soon. An insurance policy will be obtained. The whole effort is being made possible by donations of money, time, interest and material from Arboretum Foundation units and members, from the general public, from businesses and foundations in the Seattle area and from the newspapers and radio and TV stations of the Seattle area.

The Visitor Center is next: because most of the funds required are already available through earlier donations to Foundation projects, we can begin construction as soon as we complete a legal agreement with the City of Seattle on this Center and on future relations between the City and the Foundation, and agree with the City and the University on the selection of an architect. This should be soon.

The arrival in late May of Dr. Harold B. Tukey, Jr. signals the start of a new era for horticulture in the Pacific Northwest. The Arboretum Foundation is contributing $15,000 per year for the next five years toward his salary and the costs of his newly-established office of Director of the UW's Arboretum Programs.

The replacement of the irrigation system is under way, being funded by other than Foundation funds.

The foregoing improvements are aided by the Unit Council's Plant and Bulb Sales (which seem to gain strength each year), by encouragement from the Board of Directors, by a competent office staff as well as by support from the Seattle City Council (especially Councilman George Benson), from Superintendent of Parks and Recreation Walter Hundley and his assistant Ms. Rae Tufts and from Mayor Charles Royer. It has been a joy to serve you and to work with these dedicated people.

On the doubtful side: budgetary constraints imposed by the State may have a deleterious effect on the degree of maintenance to be afforded the Arboretum in Washington Park. At press time the extent of these budget cuts had not been made public. We of the Arboretum Foundation should hope that their effects will not be so severe as to jeopardize the University's obligation to provide public service and maintenance in the Arboretum.

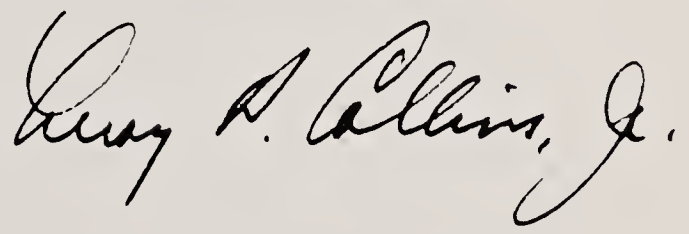

Exhibit to Benefit the Arboretum

The Louise Matzke Gallery will have a group show of paintings by a number of top Northwest Artists based on the theme, "Many Faces of the Arboretum". Mrs. Matzke has generously offered to donate to the Arboretum Foundation 10 percent of all proceeds from paintings sold during the week of July 8th to 12th. Members of the Foundation are invited to a preview on Tuesday, July 8 from 5 to 9 PM.

The exhibit will run through July 31. Hours are 11 AM to 4 PM Tuesday through Saturday. The address is 1136 Poplar Place S. (west of Rainier Avenue and just north of I-90).

A wing of the Garden Pavilion with Greenhouse and Bonsai House, taken in April 1978. Photo: Brian O. Mulligan

The VanDusen Botanical Garden Vancouver, Canada

R. ROY FORSTER
Curator of the Garden

The cities in the lower mainland of coastal British Columbia are well endowed with public parks and gardens. In particular, Vancouver has won some attention for the quality of its public plantings. There are two botanical gardens — the Botanical Garden of the University of British Columbia and the City of Vancouver's VanDusen Botanical Garden. These two gardens are a short distance from each other but differ quite widely in their origins, concept and function. Perhaps the major physical difference between the two gardens is the greater emphasis at the VanDusen Garden on horticultural display, exemplified by the art of summer bedding. This delightful practice reached its zenith in Victorian England and has long been a feature there of public parks and gardens. The use of colourful displays by means of summer bedding is seen as a vital ingredient in the success of a garden operated with public funds. Within the compass of this short paper an attempt will be made to delineate the development and *modus operandi* of the VanDusen Botanical Garden.

How does a botanical garden come into being? How should we justify the expenditure of public funds on gardens that are much more costly to maintain than conventional public parks? Of what character should be the landscape components, and what kinds of programs should the modern botanical garden offer in seeking a broad base of support necessary for its survival? A few decades ago these questions would have seemed less relevant. Today they occur with increasing frequency.

In times of national or local economic difficulty, established cultural institutions are subjected to greater scrutiny than is usual. Sometimes their fundamental structure is questioned. Gardens that enjoy the protection of "mother institutions" such as universities enjoy some shelter from these pressures. Other gardens administered by municipal governments are perhaps more vulnerable. The administrators and sup-

porters of these gardens may find themselves embattled on many fronts. The charged, emotional climate generated by these forces may have an inhibiting effect on development. Another factor that was not foreseen as part of the VanDusen experience is the pressure brought to bear by citizen groups representing the interests of established local residents and those occupying new, high-density housing on the fringes of the Garden. Planners of public gardens often view their idealized landscape plans as philosophically unassailable. This is often far from the case when it comes to implementing plans which change the appearance of the local landscape, involving real or imagined effects on views and real estate.

The past decade has seen the establishment and development of the VanDusen Botanical Garden. Ten years is a tiny segment of time in the evolution of a botanic garden, yet it is the most critical period, since it is during this time that the existence of the garden must be justified. The physical development of the Garden and the development of extension activities during this period often moved at a remarkably fast pace. This happy train of events is largely due to an effective collaboration and balance of power between the municipal governing authority (the Vancouver Park Board) and the advisory board (the Vancouver Botanical Gardens Association*). The latter has functioned as a focus and watchdog of philosophic aims and objectives.

The philosophic approach on which the Garden is based is a product of this collaboration. The Vancouver Park Board is widely respected for the quality of its public gardens — such as Stanley Park and Queen Elizabeth Park. These are the result of pragmatic leadership and a succession of gifted craftsmen-landscape gardeners. On this basis the Botanical Garden assumed its present physical form. In 1966 the V.B.G.A. sought the advice of recognized botanical garden authorities such as Harold Fletcher, Regius Keeper of the Royal Botanic Garden of Edinburgh. From the blending of these two divergent elements emerged the concept of a botanical-horticultural display garden backed by a popular horticultural education program. An early decision not to undertake scientific research permitted the channelling of energies into rapid garden construction. This decision released the staff from the responsibility of building research collections or a herbarium. However, these remain attractive visions which may ultimately become possible. The V.B.G.A. has built a reference library of 1800 volumes and employs a professional librarian. A growing endowment fund will ensure the viability of this facility, and having a librarian on staff adds much-needed support to a small professional staff consisting of a Curator, Education Coordinator and Technician.

When Fletcher visited Vancouver in 1966 his enthusiasm for the site exceeded all expectations. He found a disused golf course, 55.5 acres of which was destined to become the Botanical Garden. The high, rolling parkland sloped gently to the northeast, generously endowed with majestic Douglas fir and western red cedar. The full panorama of the Port of Vancouver and the Coastal Mountains is visible to the north. Perhaps the greatest asset is the central location close to a major centre of population.

In 1971, the site was purchased by means of tripartite funding between the Province of British Columbia, the Vancouver Foundation and the City of Vancouver. W.J. VanDusen, then Chairman of the Vancouver Foundation, was the major benefactor. His sustained support continued until his death in 1978. Development of the site began almost immediately under the able direction of William Livingstone. Livingstone was Deputy Superintendent of Parks for the City of Vancouver. His role was as the major creative force in the landscape design of Vancouver City Parks. Beyond VanDusen Gardens the best example of his work is in Queen Elizabeth Park. Livingstone is renowned for the quality of his naturalistic landscape style, and the monumentality of his work with rock and water. His work shows both the influences of the English landscape

* V.B.G.A. abbreviation

The Formal Garden, planted with roses and summer annuals. **Photo: Courtesy the VanDusen Botanical Garden**

romanticists and the British gardenesque style of the 20th century. His rockwork has a strong, massive quality, designed primarily for its own intrinsic effect and only secondarily as a means of displaying plants. Livingstone was the dominant figure in the stylistic and construction methods adopted for the first phase of development.

The writer was appointed Curator in 1972. It was indicative of the Garden policy that a horticulturist was selected for the position. In the autumn of 1972 a sustantial amount of structural landscape work had already been completed by the Park Board construction department. Through a happy coincidence with other major construction development in Vancouver, large quantities of rock, fill material and soil became available for the project at no cost. Herein lies the key to the economic viability of the construction process. The economics of moving large quantities of surplus excavated materials from the city to suburban dumping sites placed the Botanical Garden in a favourable bargaining position. Livingstone found that he could obtain most of his raw material at no cost, and in many cases contractors paid for the privilege of dumping rock and soil on the Botanical Garden site. Livingstone, with his formidable landscape technique, was thus able to establish the basic fabric of the VanDusen landscape. Basalt, limestone and sandstone rock were used extensively. Several large pieces of nephrite jade were brought from farflung reaches of the Province and these were used in the construction of waterfalls, where this beautiful material is seen to the best advantage. There are seven man-made lakes and ponds on the site. When the workmen began excavating these areas they were at first astonished to find quantities of sea shells and other marine remnants in the hard underlying shale. How could this be at 400 feet above sea level? The answer of course is the phenomenon of glacial rebound since the last ice age.

With the completion of these earthworks, the curatorial staff began the development of a planting plan. This experience is a privilege that is seldom granted to one individual, since the long-range effect is of vital significance and to some degree irreversible. The emotional condition of the participants may be compared with that of the painter standing before a primed empty canvas. Will the concept match the magnificence of the site?

Tradition lessens the dilemma. Plant collections based on important taxa are placed in habitats favourable to them. Oaks, beeches, rhododendrons and magnolias are

allotted their rightful spaces. Specific gardens for heathers, alpines and perennials are built and planted. The real challenge lies in the need for plant associations which create attractive gardenesque landscape pictures. This concept is often at variance with a layout based on a botanical system. A compromise is found in the overlapping and integration of botanically unrelated plant groups which enjoy similar ecological requirements. For example, pines and leguminous shrubs associate well, both tolerating dry, nitrogen-poor soils — a natural consequence of the gravelly overburden found throughout the VanDusen site. In the Mediterranean plant collection, *Cedrus brevifolia* and *C. atlantica* were found to associate in natural and logical harmony with *Cistus, Halimium* and *Helianthemum*. Plant associations such as these seem natural and obvious to the horticulturist and to the botanist. They fulfil the requirements of aesthetic appeal, ecological association and botanical integrity.

Plant associations based on geographic origin have proved to be very popular. There is educational value in such groupings for the student, and for the traveller they may evoke romantic memories of landscapes half-forgotten. *Pinus sylvestris, Sorbus aucuparia, Calluna vulgaris* and *Ulex europeaus* is one associaton which may evoke memories for those who have known the moorlands of the British Isles. For the Southern Hemisphere, hebes, senecios and olearias represent New Zealand, and for Chile, *Nothofagus antarctica, Pernettya mucronata* and escallonias are blended together. By means of a constant process of rearrangement and adjustment, an attempt is made to create unified landscape pictures with these components. Indiscriminate mixing of plants for landscape effect is avoided. Even with summer bedding an attempt is made wherever possible to associate plants on a geographical basis. Some areas of the garden not in an active state of development are used as temporary holding areas for miscellaneous unrelated plants. These areas may be thought of as nurseries for plants which will ultimately find a permanent place in the master planting plan. This is not offered as an excuse for bad planning but reflects a compromise made necessary due to lack of nursery space. In this sense, the entire garden is regarded as a changing, evolving and growing environment in which all the plants may be enjoyed by the public, even though some may occupy temporary quarters. Many of the plants in the organized permanent collections are slow growing by nature but ultimately occupy large areas. Temporary use of the intervening space is made for nursing on young plants. This protected environment is generally more favourable for unusual or tender plants than the unprotected nursery row.

Unforeseen circumstances often result in changes to the master planting plan. There must always be provision for such flexibility. If necessary, very drastic changes are in order if the result is to be an improvement in system, aesthetics or habitat. For example, a small *Camellia* collection was inadvertently planted in a frost pocket and languished for two years before the fault was realized. A change of location involving an elevation difference of 50 feet has made an enormous difference to the health of the plants. This in turn has encouraged the staff to expand the *Camellia* collection. Another example is the almost complete failure of the *Magnolia* collection. The plants have barely increased in size during the five-year occupancy of an inadequately drained lawn area. This experience confirms the knowledge that

The aquatic environment is found throughout the Botanical Garden and is a never ending source of fascination to young visitors. Photo: Courtesy the VanDusen Botanical Garden

magnolias perform better in well-prepared beds mixed with suitable companion plants such as rhododendrons. The observed difference in growth in the two habitats is phenomenal. Curatorial staff must always be ready to admit mistakes and remedy them before the problem is compounded by increased growth. There are certain plants in the VanDusen Garden affectionately remembered by staff as having been transplanted two or three times!

Cold winters are sometimes the means by which gardens are rearranged. The VanDusen Garden has not yet experienced a killing winter, but the winter of 1978-9 destroyed large numbers of callunas and ericas, particularly *E. cinerea* cultivars. The opportunity was thus presented to update the Heather Garden with new cultivars of *Calluna vulgaris.* A greater reliance on the hardier ericas such as *E. carnea (herbacea)* will result from this experience. The peculiar weather condition that caused the damage was a sustained cold period of almost a month in January and February when the temperature remained below freezing for extended periods. Nearly all species of *Hebe* succumbed to this onslaught and the Southern Hemisphere Garden underwent a fairly drastic revision. *Eucalyptus globulus* was killed to the ground, but *E. pauciflora* and *E. niphophila* were unscathed.

After seven years of growth since the first plantings were made, the Garden in some of its parts appears surprisingly along the way to maturity. Thinning and discarding of inferior plants is already well underway, particularly with rapid-growing plant collections such as the Rosaceae. The constant vigilance and work necessary to improve and refine collections by adjustment, deletions and additions make curatorial work a most fascinating occupation. A streak of ruthlessness is sometimes helpful, but the reward is a garden progressing toward botanical and horticultural integrity.

In a young garden with some pressure toward providing quick "visible" results, there is a tendency to overplant. Surplus "filler" plants are removed later and used again in new landscapes on the outermost limits of the developed garden. Over the past seven years the advance of the planted portion of the site has steadily covered the barren lands in a green, managed mantle. In 1978, fifteen acres of undeveloped land remained. In 1979 this was reduced to ten acres. Our Sino-Himalayan Garden gobbled up five acres with surprising ease. This garden has raised a great deal of enthusiasm among staff and friends of the Garden. The fascination that took the great plant explorers into the recesses of China and the Himalayas lives on in gardens devoted to that richest source of fine garden plants. A series of large earth mounds and valleys has been created — partly for aesthetic effect but more importantly to provide sheltered habitats with a wide variety of exposures mostly to the south and west. It is from that direction that our mild moist air comes.

The Sino-Himalayan Garden is perhaps the most exciting project in the plans for the future. Within its structure will be a bridge, a waterfall, a rock garden, several pools and, if events go according to plan, a rocky grotto for the cultivation of plants needing protection from frost. We are fortunate in having available to us two easily obtained Himalayan conifers — *Cedrus deodara* and *Pinus wallichiana (griffithii).* These will form the main evergreen structure of the landscape. Into this setting will be blended the fine Asian maples such as *Acer griseum* and *A. pentaphyllum. Magnolia sargentiana* var. *robusta* and *M. dawsoniana* will give an exotic touch and provide an upper story for many fine Chinese *Rhododendron* species.

After the development of the Sino-Himalayan Garden, the last major garden component undertaken will be the Canadian Heritage Garden. This concept is also likely to capture popular imagination, since it is the intent to gather together collections of hybrids and strains of Canadian origin, together with superior clonal selections of native species. The garden will be comprised of three geographical regions based on Eastern deciduous forest, Prairie grasslands and Western coniferous forest. Within this garden can be conserved hybrid plants which might otherwise be in danger of loss to cultivation. The plantings will also recognise the work of important plant

breeders in Canada by displaying a wide range of plants in naturalistic gardenesque arrangements characteristic of each major region.

In the master planting plan for the entire Garden provision has been made for a wide range of woody plant collections that can be cultivated outdoors in Vancouver. There is a major collection of *Rhododendron* hybrids, which is at its best in May. Whenever possible, single specimens of the parent species are associated with each hybrid group. These relationships are explained with interpretive labels. There is a good collection of the cultivars of *Fagus sylvatica*. These are planted in spacious lawns where their ponderous mass will find the best expression. Collections of *Sorbus, Fraxinus* and *Magnolia* are being built. It is intended to mix these with other collections in landscape groupings rather than adopt the traditional monoculture arboretum method.

Heathers and heaths are assembled together in a traditional-style heather garden. This garden is perhaps the most impressive architectural feature of the entire site. It has long been the writer's view that heather gardens, in their simplicity of purpose, are among the most successful of all western landscape conventions. A major collection of *Ilex aquifolium* cultivars has been planted. The policy of overlapping plant collections will be followed in this case by interplanting the hollies with hydrangeas. This has the advantage of an evergreen-deciduous counterpoint and a display of hydrangea blooms when the hollies are at their least interesting in the summer.

There are special gardens for perennials (the perennial border is an old convention worth perpetuating) and alpines. The latter provides a setting for a topiary Sasquatch (Bigfoot) in the adjacent Children's Garden. The Sasquatch is probably the most photographed object in the entire garden!

The lowest point in the garden contains a cypress pond and adjacent swampy areas. Here has been established a planting of *Taxodium distichum,* swamp cypress. This area is particularly beautiful in late fall when the taxodiums, *Liquidambar styraciflua, Clethra alnifolia* and associated plants turn colour. Simple combinations such as these are at once instructive from a biogeographic point of view, but also the most aesthetically satisfying to this writer. A major collection of hardy water lilies is being assembled throughout the lakes.

One major desired component is as yet missing in the master plan — a conservatory. It can be said that no botanical garden is complete without an indoor display of tender plants. All the supporters of the VanDusen Garden development program have the hope that at some time in the future it will be possible to build a substantial conservatory. This would then be the final jewel to be placed in the crown.

Restoration of the Conservatory in Volunteer Park

Public ceremonies were held on June 1st for the opening of the rebuilt Palm House of the Conservatory in Volunteer Park. The Conservatory (and, in fact, all of Volunteer Park) was registered in 1976 as a Historic Landmark. Restoration of the central part (the Palm House) was given first priority because it was in the most dangerous condition.

It was taken apart and rebuilt from the ground up by the Seattle Parks Department with funds from the 1968 Forward Thrust Bond Issue. The orchid collection will again be housed there, and other, formerly overgrown tropical plants will be replaced in a better scale. There will be circulation improvements, and the slate bench fronts will be replaced. Plans to restore the wings must await the availability of more funding.

A non-profit organization, the Friends of the Conservatory, has been established to aid in the future development of the Conservatory and its availability to the public as an educational and recreational asset. Membership is available through Friends of the Conservatory, P.O. Box 33103, Seattle, WA, 98133.

The Conservatory is open to the public from 9 to 5 daily, including Sundays and holidays.

Flowers of *Rosa rugosa*. Photo: Brian O. Mulligan

Some Wild Rose Species and Hybrids

BRIAN O. MULLIGAN

Some of the wild rose species are the original parents of our present-day garden roses (for example, *Rosa chinensis, R. gallica* and *R. multiflora*) through centuries of intercrossing and then intentional breeding. They come from all parts of the temperate world, mostly from the Northern Hemisphere, and may vary in habit from prostrate shrubs to the most vigorous climbing type. Many of them are well worth cultivating, in sunny situations in local gardens, for their early summer flowers in various colors and often, as well, for their showy fruits in fall. They can all be propagated by seeds, and in most cases also by cuttings.

The following are some notes and observations based on thirty years' experience growing these useful and ornamental shrubs in or near Seattle. It is not intended to be a comprehensive survey of all that have been grown or attempted here. Rather it is a suggestion of some of the better kinds for this region, either for their flowers, fruits or in some cases both.

SPECIES

Rosa brunonii 'La Mortola'.

This species is native in the Himalayas and was originally introduced from Nepal to England in 1822. The form, 'La Mortola', was introduced from the garden of that name near Ventimiglia, on the Italian Riviera, perhaps by Edward A. Bunyard, author of *Old Garden Roses* (3)[1]. The Arboretum obtained it in 1957 from the Sunningdale Nursery in England, and planted it out in 1960 on the fence at the east end of the parking area outside the offices, where it still flourishes. Later it was also planted on the Broadmoor fence in the Leguminosae section just north of Rhododendron Glen.

It is one of the most vigorous climbing roses in the Arboretum collection and needs adequate support such as a high fence or an old tree to support its branches. The leaves, with five to seven leaflets, are soft, gray-green in color due to the pubescence on the upper side; the largest leaflets are 3 to 3½ inches long and up to 1¼ inches wide. The inflorescence branches and pedicels are also softly hairy, the buds ivory-colored, opening to pure white flowers 2¼ to 2½ inches wide and slightly fragrant. The total effect of these masses of white blooms covering the branches and the fence is overpowering, equalled by few other climbing plants in the entire Arboretum. The fruits are rather small, oval and apricot in color.

Rosa glauca (R. rubrifolia).

This species grows wild in the mountains of central Europe, and at least as far south as southern Yugoslavia, where we saw it near the road from Cetinje to Kotor in June 1967 in very good color forms. It forms an upright bush six to seven feet in height and would make a delightful informal hedge if raised in sufficient quantities from seeds, which are regularly produced. It was illustrated by John Lindley in his *Rosarum Monographia* of 1820, which has recently been reprinted.

Rosa glauca belongs to the same group, *Caninae,* as the dog rose (*R. canina*) and the sweetbriar (*R. eglanteria*) but differs greatly

[1]Numbers in parentheses refer to numbered references at the end of the article.

from both in the purple color of the young shoots and leaves, which remains well into the summer. Thorns are few and scattered—another advantage over the other two, which are both extremely prickly with hooked thorns. The five to seven leaflets have conspicuous, broad, red-tinged stipules. Flowers, borne in clusters in early June, are each 1¼ to 1½ inches across, rose-pink with a distinct white eye. The fruits, ripening in August and September, are a glossy red, about half an inch or slightly more in diameter, and last for some time on the plants. A sunny situation is desirable to ensure typical growth and good leaf color. Graham Thomas remarks of *R. glauca,* "There are very few shrubs of any kind with such distinctive garden value as this open-growing species" (5).

Rose hirtula (R. roxburghii var. *hirtula),* burr or chestnut rose.

This Japanese species, found in central Honshu, was grown for many years at the Arboretum under its synonym, but following Ohwi's *Flora of Japan* (1965) (English edition by Meyer and Walker), we have revised the nomenclature. Rather curiously, the double-flowered form was first introduced from China to England in 1824, the single form from Japan before 1880. The former is probably now quite rare in western gardens; the latter can be easily propagated by seeds and probably also by cuttings taken in the fall. It is so different from other species of *Rosa* in its spiny green fruits that it has been placed by some botanists in a different genus, *Platyrhodos;* however, since it will hybridize with other rose species this seems unnecessary.

In the garden *Rosa hirtula* grows into a very large, upright, multistemmed shrub, to 12 or more feet high; so it is not a plant for the average small place. The bark peels off the old stems in strips; the young shoots are green, rather like those of some bamboos; thorns are few except on young branches where they appear in pairs below the leaves and are reddish in color. The leaves resemble those of a pinnate-leaved *Sorbus,* mountain ash, having usually seven pairs of small (1 to 1¼ inches long), finely serrate and pointed

Photo: Brian O. Mulligan

Spiny one-inch fruits of *Rosa hirtula* mature in early August.

leaflets, with thornlets on the underside of the rachis.

Flowers begin to bloom in late May; they are much like those of the European dog rose (*Rosa canina*), but slightly larger, bright pink and profusely borne on an old plant, and quite showy for about two weeks. The remarkable fruits—hard, green and spiny, about an inch in diameter—ripen during August and September, then fall in a very short time. The shrub is used for hedges in western China and would probably be adaptable for the same purpose here if regularly pruned and shaped.

Rosa hugonis.

Father Hugh Scallan, for whom it was named in 1905, introduced *Rosa hugonis* from western China (Szechuan province) to Kew Gardens. Another introduction slightly later was by William Purdom to the Arnold Arboretum at Boston from a more northern location. The species is hardy there.

It eventually grows into an open shrub six to eight feet high and nearly as wide; the

Pale yellow flowers of *Rosa hugonis,* 1¼ inches wide.

Photo: Brian O. Mulligan

Photo: Brian O. Mulligan

Flask-shaped fruits of *Rosa moyesii*.

brown stems are covered with soft spines mixed with bristles, but the flowering branches have straight, slender thorns. Leaflets, usually nine, are no more than half an inch long and decrease in size toward the base of the leaf; their margins are finely serrate except at the base. The creamy-yellow to primrose colored flowers appear in early May, held up like small chalices along the branches and almost or quite touching one another. Unlike most wild roses, the petals do not open widely. The fruits, which are seldom produced in our area, are small, round and dark red, falling as soon as mature. For its flower color, attractive foliage and early bloom this is certainly a useful shrub. There are other species with brighter yellow or golden flowers (*Rosa xanthina* or its hybrid 'Canary Bird', for example) but these are harder to find.

Rosa moyesii.

This plant was named for the Rev. J. Moyes, a missionary in western China, whence it was introduced by E.H. Wilson to England in 1908. The type has blood-red flowers, but in var. *fargesii* and the closely related *Rosa holodonta* they are rose or pink. Wilson himself noted these variations in western Szechuan in June and July that year, and even earlier in 1903 on his expedition for the Veitch Nursery (2).

Under cultivation this species can grow up to about 10 feet, the tall main branches tending to become bare at the base; so it should be planted at the rear of a border or behind smaller evergreen shrubs. The selection distributed from the Royal Horticultural Society's Garden at Wisley, Surrey (named 'Geranium' by the present author in 1936) is smaller and more compact, the flowers a brilliant red, the fruits large and smooth. The leaflets vary between 7 and 13 per leaf and from one half to one inch long, with margins often doubly serrate. Flowers are produced singly on short lateral branches, from late May into June, and are 1½ to 2 inches in diameter, the prominent sepals dilated at their tips. The handsome, flask-shaped fruits ripen in late August and September; being 1½ inches long or more and bright red or scarlet, they are highly ornamental. After seeing six- to seven-foot high bushes loaded with these brilliant hips last September at Sissinghurst Castle in Kent, England, I can only agree with Mr. Graham Thomas when he says that these "were probably of more value [than the flowers] in getting it the recognition it deserved" (5). In our garden, the pink-flowered variety (or a hybrid of it) flowers and fruits heavily every year and also produces self- or bird-sown seedlings.

Rosa rugosa.

Commonly called the Japanese rose, *Rosa rugosa* is also native in Korea and northern China. It is often found growing on sandy soils near the sea and consequently has considerable value for such sites elsewhere because of its stoloniferous habit of growth.

In our gardens it usually grows five or six feet tall. The glossy, markedly veined foliage is clustered at the tops of the extremely prickly stems, which tend to lean with the weight of the flowers and, especially later, the bunches of tomato-red fruits. The large (about four inches wide) flowers open about the end of May or in early June, and are produced in succession for some time; they are highly fragrant, a character which has been transmitted, along with the thorny stems in most cases, to many of its numerous hybrid offspring. While the typical species has flowers of a rose-purple hue, there are also a more charming white form and several hybrids with clear pink blooms, for example, 'Delicata' and 'Frau Dagmar Hastrup'. Plants of the type should be pruned regularly to remove some of the older stems and retain the younger.

HYBRIDS

Rosa collina 'Andersonii'.

The origin of this attractive shrubby rose is not known with certainty, but it was first listed in 1912 in an English nurseryman's catalogue. The probable parents are the French rose (*Rosa gallica*) and *R. canina* or its near relative *R. corymbifera.* The strongly hooked thorns certainly suggest the influence of the latter species, and the large, bright rose-colored flowers, as well as the foliage, suggest the former. The plant forms a rounded bush some five feet high and rather more in width after 21 years' growth in the Arboretum, and is more easily pruned and managed than the dog rose. The stems are green, the leaves a dark mat green, hairy on the underside. The flowers appear in early June, held up on short spurs along the branches or in clusters at the ends of the new growths, opening in succession; each is 2½ to 3 inches across, the sepals noticeably pectinate or feathered. The globose red fruits, each about ¾ inch in diameter, ripen in September and October and often hang on through most of the winter.

Rosa x *pteragonis* 'Cantabrigiensis'.

This is one of the several hybrids between *Rosa hugonis* and *R. sericea (R. omeiensis)* which have been given the collective name of *R.* x *pteragonis*. It was raised in 1931 at the University Botanic Garden, Cambridge, England, by Dr. C.C. Hurst while he was investigating the genetics of *Rosa* species. The growth habit is quite different from that of *R. hugonis,* being strongly upright, with the branches dividing in the upper part. Stems are chocolate-brown, covered with small soft bristles to their tips, and have short, straight reddish thorns in pairs below each branchlet. The small leaflets are densely glandular beneath and on their margins. The flowers appear usually in mid-May and are more conspicuous than those of *R. hugonis,* although slightly paler and more creamy-colored; but they are held up on longer pedicels and more open, therefore wider when fully developed. They also have a perceptible though slight fragrance. The plant does not seem to suffer from the die-back of branches which often afflicts *R. hugonis.*

Rosa 'Cantabrigiensis'. Photo: Brian O. Mulligan

Rosa gallica 'Complicata'.

This plant is so much larger in all its parts than any other variety or hybrid of the French rose that one may legitimately wonder how that name came to be attached to it. Even such an authority as Graham Thomas says, "I mentioned this rose in *The Old Shrub Roses* [4] and have been unable to find out any more about it" (5). Even though it is normally four to five feet high and can reach to eight or even ten with some support, nevertheless the display it puts on when in full

Rosa collina 'Andersonii'. Photo: Brian O. Mulligan

Rosa gallica 'Complicata'. **Photo: Brian O. Mulligan**

bloom in early June well justifies including it somewhere in the garden, perhaps on a fence or behind other smaller shrubs. The stems are green and almost thornless; the upper three leaflets are much larger than the lower two, all coarsely and sharply serrate, with large stipules and long acuminate tips. The flowers are carried in small clusters at the ends of the new shoots, opening in succession in early June to wide platters of bright rose, each about four inches across. Sepals are noticeably pinnate. Since some fruits are generally formed, one might get a better idea of the parentage of this handsome rose by raising plants from their seed. Propagation by cuttings taken in October is not difficult.

Rosa 'La Follette' (*R. gigantea* x a hybrid tea rose).

Rosa gigantea is a native of Upper Burma where it climbs trees to a height of 40 or 50 feet and festoons them with enormous pale yellow blossoms. It was introduced to England in 1888 but was soon found to be much more suited to the climates of the Mediterranean coasts of France, Italy and Spain and, later in this century, to California and Australia. By crossing it with various garden roses, some spectacular hybrids have been raised of which 'La Belle Portugaise' (1903) was one of the first. 'La Follette', raised at Cannes, France in 1910, followed soon afterward. A plant was obtained from an English nursery in 1949 amongst a number of other species and hybrids and was planted the following year on the fence south of the foreman's cottage alongside another named *R. "moschata plena".* This proved to be unfortunate, for the latter quickly outstripped the former and grew to the top of an adjoining cherry tree, which it still covers. 'La Follette' exists beneath it, but has been considerably suppressed, although the fact that it has endured here for 30 years speaks well for its hardiness in this climate.

The young shoots are purplish-red; the five leaflets are glossy, one to two inches long, sharply serrate and acuminate. In late May and early June, the flowers appear in clusters of three or four at the ends of the new shoots; in the bud stage they are deep rose but turn to pale pink when fully open; they are 4 to 4½ inches wide and very beautiful. Large, obovate fruits are often produced. E.A. Bunyard said of it: ". . . this most distinguished hybrid of *R. gigantea.* It would be worth growing for its foliage alone" *(New Flora and Silva,* Vol. X, Part 2, 1938*)*. Probably it should be re-propagated at the Arboretum and given a fresh start elsewhere. 'La Belle Portugaise' is available in California as 'Belle of Portugal'.

Rosa "moschata plena".

As mentioned above, this plant was obtained from England in 1949 under this name and has flourished ever since in its original site, as well as having been propagated by cuttings and grown elsewhere. It is a most vigorous climber and therefore needs an old tree or sufficient space on which to extend and display its ample charms each June. The stems are green and slightly glaucous; the thorns are hooked and in pairs below the branchlets. The leaflets, usually five but occasionally three or seven, are thin in texture and almost glabrous except for some hairs

on the veins beneath; the latter are very evident on both sides and raised beneath. The flowers, opening here sometime in June according to the season, are produced in dense pyramidal corymbs on glandular, hairy pedicels; each is 1¼ to 1½ inches wide, semidouble, creamy-white and fragrant; the buds are ivory-colored; the sepals are reflexed and long acuminate. An old plant in bloom with a mass of such fragrant flowers is delightful and delicious to the senses.

As to the real identity of this rose, it is definitely not the true *Rosa moshcata* of Herrmann (1762), which flowered in the autumn, as was also noted by John Gerard in his *Herball* of 1597, and by John Parkinson in 1629, who knew a double form at that date. Our plant very much resembles a hybrid between the musk rose *(R. moschata)* and *R. multiflora;* this 1835 hybrid, named 'The Garland', is described on page 73 and illustrated by a pencil drawing (Fig. 7, page 101) in Graham Thomas' book (6). However, an extended correspondence, with exchange of material in the form of color slides, photographs and dried foliage, has failed to bring a definite identification from Mr. Thomas. So for the time being it remains *R. "moschata plena"* until someone can really identify it. Apart from that problem, it is certainly one of the best of the climbing, white-flowered roses in the Arboretum, but it does need space to grow.

Rosa "Polyantha Grandiflora".

Another vigorous climbing rose with an uncertain history was obtained as *Rosa sino-Wilsonii,* from the same source at the same time. This is a rather tender species from southwestern China, which our plant proved not be be. The same form turned up again eight years later under the name of *R. gentiliana,* another species originating from western China and introduced by E.H. Wilson. In this case, however, Mr. Thomas has been able to identify the plant in question as *R.* 'Polyantha Grandiflora' of Bernaix (1886), even though, as he says in the same book, page 43, this name "is not really permissible since it infringes the International Code of Nomenclature; *R. polyantha* is a synonym of *R. multiflora* and is, besides, used as a group name for the Polypoms." He adds, " . . . it is probably *R. multiflora* hybridized with a garden rose . . ." (6).

At the Arboretum it was first planted on the fence at the entrance to the offices but removed later when it occupied too much space. Another plant on the fence south of the caretaker's cottage still remains, smothering it annually in early July with a billowy mass of white blossoms. These are borne on glandular pedicels in large panicles, opening widely to two inches across and having a bunch of golden stamens filling the interior of each flower; they are also slightly but distinctly fragrant. Other characters of this plant are: the mahogany-red young shoots and red-tinged petioles; the large, glossy leaves with leaflets from two to nearly three inches long, finely serrate and with pectinate stipules (but much less so than in *Rosa multiflora*); hooked thorns scattered along the stems and very small, almost bristly thornlets all along their length—an unusual feature of any rose. Oval, orange-red fruits are often produced, but never in any great quantity, though they are quite decorative in the fall. This is altogether a striking plant if one has

Rosa **'La Follette'.** **Photo: Brian O. Mulligan**

an old tree to support it. As with so many of these roses, propagation is easy by cuttings taken in October.

Rosa x *richardii.*

Also known as *Rosa sancta,* of A. Richard but not of Andrews, this is believed to be a hybrid of very ancient origin between the French rose *(R. gallica)* and *R. phoenicia* from the eastern Mediterranean region where both are native. The latter is a scrambling or trailing rose of the *R. multiflora* type, producing corymbs of small white flowers; it is not in cultivation here as far as I am aware and might well prove not to be hardy in this climate.

Rosa x richardii certainly strongly suggests such parentage both in its low-growing, partly trailing habit, and in its small clusters of flesh-pink flowers held up on the branches in late May or early June. The young shoots are tinged purple; the older stems are green and carry both hooked thorns scattered along the branches and also sparse bristles which are more prevalent on the glandular new shoots. The five leaflets are serrate, mostly ovate or oval except the larger, terminal, obovate leaflet, which may be two inches long; the lowest two are much the smallest. Leaflets, petioles and entire stipules are also glandular, as well as the pedicels and the prominently feathered sepals, but not the ovary.

The flowers are about three inches across, almost as large as those of the French rose, and as several are borne on each lateral branch there is a succession of bloom for perhaps two weeks. No fruits have been formed. In the garden it is a useful rose for covering banks, since its total height does not seem to be more than three feet, but of course its short season mitigates against using too much of it. Pruning would be limited to removing some of the oldest branches periodically.

Rosa villosa 'Duplex' *(R. pomifera* 'Duplex'*).*

That this rose has been known in gardens for more than two centuries is attested to by its 1775 entry as *"Rosa villosa duplex,* Semi-double Apple Rose" in Richard Weston's catalogue. It also was illustrated by Miss Mary Lawrance in her *Collection of Roses from Nature* in 1779. Graham Thomas tells us that it " . . . is undoubtedly a hybrid between *R. villosa* and a tetraploid garden rose, according to the chromosome count" (5). Nevertheless it is much more like the species in habit, in stem and leaf coloring and in the bristly dark red fruits than any garden rose of that period and should be treated as such when siting it amongst other roses. Eventual height is about six or perhaps seven feet; the young stems are waxy and glaucous-gray, the thorns stout and nearly straight, scattered along the stems but usually below the branchlets or winter buds. The leaflets are five or sometimes seven, large (to 2½ by 1½ inches), oval to ovate, coarsely serrate, softly hairy on both sides and gland-edged as are the large stipules. Flowers up to three on each branch appear in mid-June or thereabouts, at the same time as *"moschata plena".* They are 2½ to 3 inches across, semidouble, bright pink at first but fading to pale pink; the sepals are noticeably pinnate. The pedicels and ovary are bristly-spined as are the fruits, which are ovoid, dark red and about an inch in diameter, much like a red gooseberry. This may be described as a rose of character and distinction, to be used with others like it in a sunny border.

Rosa villosa **'Duplex' with pinnate sepals.**

Photo: Brian O. Mulligan

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Species Roses in Washington

JEAN WITT

Four species of *Rosa* are native to the state of Washington. *Rosa gymnocarpa,* the most easily recognized of our wild species, is a delicate woodland shrub with prickly stems, found in forested areas throughout the state. Its leaflets are finely and doubly serrate with glandular-tipped teeth. Nickel-sized pink flowers on glandular pedicels are scattered over the ends of the current year's branches. The sepals are short; and sepals, hypanthium and styles drop away as a unit after flowering, leaving the small vermillion fruits naked and berry-like.

Our other three species of native rose are considerably stouter shrubs from more open habitats. Their stems are only moderately prickly, the prickles just below the stipules of the leaf bases being better developed than elsewhere. Their sepals remain attached to the hips at maturity and are long and conspicuous.

Rosa pisocarpa occurs west of the Cascades at low elevations in streamside thickets and swampy places, including the Arboretum. Its ovate leaflets are finely and closely serrate, puberulent on the undersurface and along the rachis. Corymbose clusters of rather small flowers (these flowers about 30 mm across) appear at the ends of the current season's growth, followed by numerous small orange-red fruits. Sepals backed with glandular-tipped bristles are a distinguishing feature, though the hips themselves are glabrous and even glaucous.

Rosa woodsii occurs east of the Cascade summit, along creekbanks and ponds of the foothills and lowlands, in otherwise rather dry habitats. Its elliptic to obovate leaflets are singly and more coarsely toothed than in the preceding species, and tend to be more cuneate toward the base. Smallish flowers are grouped in corymbose cymes on lateral branches, while the sepals are mostly glabrous on the back. Hips are about the same size as in *R. pisocarpa*—one half to slightly more than one cm across. Our Washington plants belong to var. *ultramontana;* other varieties occur to the east and south.

Rosa nutkana is found in open places in woods at moderate elevations, both east and west of the Cascades. Its elliptic to ovate leaflets are singly or doubly serrate. The solitary flowers are large and conspicuous, borne on the ends of the many lateral branches, often forming great arching garlands of bloom. The orange-red hips may be up to two cm across. This is the only one of our native roses that can really be called showy—it can be quite striking, both in flower and fruit, and it is delightfully fragrant. Though no particular effort seems to have been made to bring it into cultivation, Brian Mulligan has made one selection, collected on Whidbey Island. The form from southeastern Washington, which previously was called *R. spaldingii,* is especially good. Plants growing west of the Cascades are referred to var. *nutkana,* and those from east of the Cascades to var. *hispida,* but the two intergrade, particularly in the northern part of the state. C.L. Hitchcock, in *Vascular Plants of the Pacific Northwest,* also points out that *R. nutkana* is typically found at higher elevations than *R. woodsii* in areas where both occur.

Hybridization is known to take place between all combinations of the four species resulting in intergrades and ill-defined variations within the species.

Plantsmen of the Pacific Northwest

C. Leo Hitchcock

JOHN PUTNAM
and
JAN PIRZIO-BIROLI

With this article we begin a series on "Plantsmen of the Pacific Northwest". (When we select a woman to honor, we shall simply call that portion of the series "Plantswomen . . ." instead.)

The Pacific Northwest has immense appeal for plant lovers on several levels. Our climate is mild enough to permit the culture of a wider selection of ornamental plants than can be grown in most parts of the country. Thus we have a large number of outstanding gardens and exceptional gardeners, not the least of which is our own Arboretum with its excellent staff and loyal supporters. Our native flora, though not as rich as that of some parts of the world, is especially varied because so many different life zones are represented within a range of a few hundred miles. On a single day one can drive from seashore to arctic tundra (one might have to walk the last few miles), from rain forest to the Upper Sonoran Desert. It would be a long day, but it could be done.

The first man we present to you, C. Leo Hitchcock, is an all-around plantsman. His profession as taxonomist has been concerned primarily, of course, with native floras. He came to the Botany Department at the University of Washington in 1937, and shortly thereafter began a garden of native and exotic ornamentals that was legendary for its beauty and for his ability to grow in vast quantities some of the rare, difficult plants that the rest of us nurse along as single specimens.

An excellent article by one of his long-time colleagues, Professor Arthur R. Kruckeberg, was published in Madrono *(Vol. 20, No. 8, October 1970). That tribute to Dr. Hitchcock described in detail his training and his career. We regret that space does not permit us to reprint it, for the articles that we have prepared describe a less formal aspect of his life, and much of the background material has necessarily been ignored. Perhaps the following brief facts will provide a sketchy framework:*

Born April 23, 1902 and grew up in California. Undergraduate training and MS degree from Pomona College under Philip Munz. MS thesis on *Godetia* (now *Clarkia*).

PhD (1931) from Washington University and the Missouri Botanical Garden. Thesis under J.M. Greenman on *Lycium*, a member of the family Solanaceae.

Taught at Pomona College (1931-32) and at the University of Montana at Missoula (1932-37), where he prepared a detailed manual of grasses for classes in forestry and agriculture.

Came to the University of Washington, Department of Botany, in 1937, where

he was department chairman for many years, and where he became Professor Emeritus in 1972.

The five-volume *Vascular Plants of the Pacific Northwest,* in cooperation with Arthur Cronquist, Marion Ownbey and J.W. Thompson, published from 1955 to 1969.

The field manual, *Flora of the Pacific Northwest,* an abridged version of the above, completed in 1973.

His name is C. Leo Hitchcock, and the majority of his students have been convinced that the "C" must stand either for *contrary* or for *contradictory*. It might just as well mean *chairman* for many years of the UW Botany Department, or *creator* of an exquiste garden of native and ornamental plants, or *collector* of thousands of herbarium specimens. Playing with words is characteristic of Hitchcock, for he is an unrepentent punster and an irrepressible perpetrator of verbal absurdities. He is most famous, however, as the senior author of the five-volume *Vascular Plants of the Pacific Northwest* and the indispensable *Flora of the Pacific Northwest.* He is best known locally for his night course on identifying northwest native plants, a class that has touched the lives of innumerable nature lovers.

Some of the qualities that have made him so beloved are: an unerring sense of humor, no less acute when it is turned on himself; an intellectual honesty and humility that make a great scientist and even greater teacher; a prodigious energy and drive; and an apparent wickedness that is contradicted by his soft heart. Even when he has seemed to be at his most contrary, there usually has proved to be a well-reasoned explanation for his behavior. However, his most ardent admirers would admit that they take the greatest pleasure in pointing out his errant ways.

Most of all, it is the field trips that we associate with Hitchcock, probably because more of us have shared that aspect of his life, even if only for a day or a weekend, than any other. In spring, the desert has been a revelation to students who have known the more gentle landscape west of the Cascades and who have learned through him that at the right time of year the desert truly blooms, that it is not a hostile environment if one is prepared with a five-gallon jug of water, a camp stove and good company.

The following paragraphs describe Hitchcock field trips that took place during the summers of 1941, 1946 and 1947, and the spring of 1972. The first three are described by John Putnam, who has the distinction of having acquired more field-trip credits than any other UW botany major. The 1972 trip was the last long one that Hitchy led officially before his retirement as senior taxonomist in the Botany Department. For this reason, it was a kind of reunion, and it drew old friends and former students from as far away as New York and Washington, D.C. Furthermore, it was somewhat more relaxed than the all-summer courses of earlier years, for it capped two quarters of intensive classwork and took place during spring break. My husband and I consider ourselves lucky to have been part of it. *J.P-B.*

1941

When I entered the University of Washington in 1938, one of my classes was an introductory botany course taught by a relatively new professor, one C. Leo

Hitchy keying one of his beloved grasses, 1972.
Photo: G. Pirzio-Biroli

Studying from the blackboard bolted to the panel truck, 1941. Photo: M.D. Ashworth

Hitchcock, PhD. The material was interesting and well presented and I was an eager student, but during one of the early lectures I kept dozing off. Suddenly there was a sharp little sting on my face and the sound of a piece of chalk hitting the floor; I was instantly wide awake and stayed that way. Remarkably the professor hardly paused in his lecture or stopped writing on the board. I didn't know it then but that embarrassing moment introduced me to one of my most respected teachers and valued friends.

Even though I was a forestry student, botany continued to be one of my favorite subjects, so in the spring of 1941 I asked Dr. Hitchcock if I could go on the field trip planned for that summer. At that time summer field trips lasted the entire quarter and carried 12 credit hours. On this one we would go into the Canadian Rockies by automobile—a real adventure, for at that time the roads weren't all that great and Canada was already involved in World War II.

Except for an old International panel truck provided by the University, the other six cars belonged to the students and Hitchy, who drove his own and pulled a collapsible tent-trailer. I drove a 1936 Chevy sedan for which my Dad was very pleased to have found a set of four new tires; one of them actually finished the trip. In addition to the drivers we had some 19 passengers. We were really packed.

Besides personal gear, tents and sleeping bags there were wood stoves, food and cooking equipment as well as card tables and folding chairs for classes, and plant presses and drying frames for the herbarium specimens we would collect. There were even kerosene lanterns to provide heat for the drying frames although now and again the wicks wouldn't be trimmed quite properly and the presses would get pretty badly smudged. A blackboard was bolted to the side of the truck and, with that and the card tables and chairs, a very business-like classroom-laboratory could be set up.

We had hardly started when I became aware of some of Hitchy's underlying concerns. Our first camp was at Hope, BC and somehow I had missed the directions and got lost in New Westminster. I was two hours late getting into camp with the four young women that had been assigned to me. After dinner Hitchy called me aside and commented on the behavior of some of his students that had upset him on an earlier field trip. These remarks were quite pointed—and seemed pointed right at me. Being both innocent and thoroughly embarrassed, I resolved to be on time and a gentleman for the rest of the trip. Also there was never any question about the academic integrity of the course work. I think that Hitchy was very sensitive to the possibility that some students as well as some of his colleagues might think such a trip was too frivolous an environment for serious learning. He saw to it that there would be no basis for any such rumor. He also had a thing about leaving a messy camp, expecting to

take some 25 people into the woods, set up camp and then leave the place looking better than when we arrived. If, when we were packed up ready to go, he spotted a piece of litter, there would be a pop quiz you wouldn't believe.

Feeding a group as large as ours was no small task, particularly since we tended to stay away from centers of population and designated campgrounds. Organization of the commissary and of the various kitchen committees was beautifully handled by Una Davies, a botany professor at Multnomah College in Portland, Oregon. She was a beautiful person in every way—quiet, thoughtful and helpful—someone the girls could turn to and from whom you could borrow a button and needle and thread. She also passed judgment on the various cuts, scrapes and bruises that occurred around camp. There was always quite a flurry when she walked into the general store of some sleepy little BC town and laid down a grocery list for 25 people. The meals were hearty and good, and she ran the kitchen like an army mess sergeant. The big treats, however, were the biscuits, cinnamon rolls, cakes and pies turned out by Hitchy amid great flourishes and tremendous clatter of pots and pans. These masterpieces were lengendary—baked in a camp oven over a wood fire.

One of our earlier camps was in the "Summer Ranges", an upland area near Kamloops where cattle were ranged during the summer. It was beautiful rolling country with groves of pine and aspen set in wide grassy areas, dotted with lakes usually connected by slow-moving streams broken into ponds by beaver dams. Many of the lakeshores were the nesting sites for a host of water fowl.

We drove in about 15 miles on a narrow, two-rut dirt road and made camp. After the tents were pitched and the commissary tarpaulins were set up, it began to rain and it rained incessantly for several days straight. We realized that the roads that brought us in were now mud traps and were not going to let us leave.

The time was well spent however: botanizing—the flora was not too exiting but new to beginning taxonomists; lectures—the grass family before the cattle got to the samples; and bird watching (one of the teaching assistants was a zoologist who led the class on some fascinating walks along the shores to observe the many species of birds nesting there). Keeping warm and dry also occupied more time than usual.

The zoologist was making a small collection of bird and mammal skins. This led to some scalding criticism by some students and to the adoption of some unique class pets. One of the first specimens brought into camp was a female flying squirrel (dead) and her four young ones (alive). The female was quickly skinned and labeled and one of the young ones was in the process of joining her when a girl zipped in and rescued the remaining three. A makeshift cage was constructed and soon the entire camp was involved in the care and feeding of flying squirrels. Two of them met untimely and tragic ends but one of them made it to adulthood and was released.

A search for the source of some squeaking and rustling sounds coming from within a beaver dam revealed two young mink. One of them quickly became a specimen and the other became "Benny-Butch", the camp mascot and a hyperactive child if I ever saw one. Later, when it was discovered that she was a lady mink, the purists dubbed her "Minnie".

Whereas the baby squirrels were being fed milk from a medicine-dropper, the young mink wanted fish, not too difficult to provide in this area. Several students had fishing poles and were quite willing to help. Soon Benny-Butch had the run of the camp and was catching her own fish. Her student

Benny-Butch alias Minnie the Mink, 1941.
Photo: M.D. Ashworth

Hitchy feeding one of the flying squirrels, 1941.
Photo: M.D. Ashworth

foster mother had some trying moments when it appeared that the little mink had returned to the wild—particularly when we were about to move camp—but she always turned up just in time.

Later on during the trip the little mink (not so little anymore) could be found taking care of herself very nicely, thank you. Being nocturnal by nature, she nestled in a student's warm shirt for her morning snooze and swam icy streams for fish at night with a quick warm-up and dry-off in somebody's sleeping bag.

Late one night she was sharing Hitchy's sleeping bag. About midnight she got hungry, slipped out to a nearby stream, caught a fish and scooted back to the bottom of his bag, soaking wet, icy cold and with the fish still wiggling. Hitchy shrieked and kicked his feet. The mink, having the same scent gland as a skunk, used it, and Hitchy came boiling out not exactly dressed for traffic. The sleeping bag—deminked, defished and aired out—was barely usable the rest of the night. After the trip Benny-Butch really made the scene as she loped along University Way in Seattle, decked out in a little harness and leash.

Hitchy's official field-trip uniform was bib overalls, a painter's cap and whatever else it took to make him respectable. The painter's cap began the trip sparkling new but developed a fair degree of raunch by the end. When the weather warmed up, a pair of bib overalls was converted into what might pass for shorts by having the legs hacked off just above the knees with a jackknife. It really was a practical outfit which fortunately never caught on.

Although we were set up to camp independently anywhere, we were not too proud to take advantage of such things as abandoned road camps, houses and barns. Usually they required a bit of cleaning before we could move in, but since the weather was still inclined to be wet we appreciated them anyway. Once when we used an old road camp, a small group of porcupines moved in about the same time. The first thing we knew, one of them had just about finished eating a hiking shoe and was nibbling on an axe handle for dessert. After a short skirmish we had the camp to ourselves. Near Revelstoke we moved into another old camp that was overrun with rodents of all kinds. The zoologist had just finished setting a few traps when the first one snapped. By the time he had retrieved his catch the other traps had all been triggered. By bedtime the mouse and rat population had been reduced considerably but they held a convention anyway, all night long, around and over our sleeping bags. The next morning everyone was willing, even eager, to have the skin collecting continue, at least at that camp.

Students were encouraged to keep small collections of plants in order to review them—not the whole plant necessarily, but a leaf or twig or flower—just enough to recall its particulars. Hitchy, concerned about the rarity of some species, let us know which ones he didn't want collected. The bits and pieces we did collect we kept in the cheap, "pulpy" books available at that time—usually adventure, western or detective stories. When it was his bedtime, during those long twilight evenings, Hitchy would wander through a group of studying students, spot a bookcover that struck his fancy, pick up the book, shake its contents out on the ground and saunter off to his tent. One evening he chose an African adventure story. And the next day, on a particularly arduous part of a class hike, this strained voice kept repeating, "Bwana dowana gowana." Hitchy had created the class slogan.

Touch football and softball were favorite forms of recreation. Whenever there was a field near camp, teams would be selected after dinner and the game would last until it was too dark to see the ball. Hitchy was an enthusiastic player but quit when his bedtime came. If the game went on until it interfered with his sleep, you could expect a pop quiz right after breakfast the next morning.

The lakes, streams and beaver ponds provided plenty of opportunities for fishing. All that was needed was the time. Hitchy also had his fishing gear and enjoyed the sport. Now and again the combined catch was large enough so that everyone could have fish for breakfast. But not Hitchy—his comment was, "Who can eat those slimy snakes?"

As the summer wore on, we found ourselves in some of the world's most spectacular mountain scenery. The group was compatible and the camp routines were well established. The narrow gravel highways, combined with the fact that the Canadians were at war, meant that we pretty much had the place to ourselves. (Years later after the war, when I returned with my family, I found the roads had been paved and the trees cut back from the edge of the highway making the views even more continuously breathtaking, *but* we were not alone.) Lectures, spot quizzes, day hikes up into alpine areas to study and collect made up the academic part of our trip. Camping at such places as Moraine Lake, Yoho National Park and Jasper left pleasant memories that I carried with me through four years in the Air Force during the war.

Hitchy fishing, 1941. **Photo: M.D. Ashworth**

While camping near Jasper, an incident occured that showed Hitchy's unique ability to get along with his students. A small group of us decided to go to a dance in town one evening, and it seemed like a good idea to liven things up a bit with a cocktail party before we went, so someone bought a bottle of gin. Hitchy found out about it somehow and volunteered to serve as bartender. Who could say no? I don't know what happened to the gin but very little of it showed up in the drinks. Yet everyone had a good time.

Our final exam was at a camp along the Blackfoot River outside of Missoula, Montana. Hitchy pulled out specimens collected from the first day of the trip on and added others from all around the local countryside. Never in the world had I seen so many plants, and to think we were supposed to know them all!

1946

I returned to the University as a botany major during the fall of 1945, and was a teaching assistant the following summer for a trip into the mountains of Idaho and Montana. Hitchy had been collecting with Clarence Muhlick during the war.[1] Clarence and Hitchy became friends when they were both at the University of Montana in Missoula—Hitchy as a professor and Clarence as a student and football player. Clarence was a public school teacher when he was invited to come to the University of Washington as a lab technician. He was a big man and just as nice as he was big. His fingers were like sausages but he could do the most delicate things with them such as making microscopes slides and repairing delicate instruments.

Clarence had one bad habit: he bit his fingernails. Every time Hitchy caught him at

[1]Editor's note: Hitchcock recalls that during one of those summers he and Clarence collected about 30,000 specimens including those for the UW Herbarium and duplicate sets to be distributed to other herbaria. They would, for example, climb to a likely meadow and Hitchy would collect one of each plant he wanted put into press. He would then leave Clarence to collect and press the duplicates while he climbed to a higher area to scout for additional species. Sometimes his enthusiasm would be too much for Clarence, who would say "Aw, Doc, when ya' gonna stop?"

it he would haul off and slug Clarence as hard as he could on the shoulder. Clarence would wince, look hurt and say, "Aw Doc, take it easy." Everybody loved Clarence.

This was the first trip since the war to involve students. Seven of us started out one sunny June morning—Hitchy, Clarence and five students including Jimmy Nishitani, Doug Post, Dick Norris and a guy named Maxwell. Some of us were veterans and since the trip was made up of all men it made for some rather salty comments now and again. Campfire stories usually revolved about the war, and the first liar never had a chance.

Our field work involved plant identification and the use of some new plant keys that Hitchy was working on, as well as collecting and pressing plant specimens. Transportation was by the old International panel truck and Maxwell's car. We were also equipped for overnight hiking with packs and mountain tents. Much of our collecting was in alpine areas and we headed for the highest point wherever we were, with a plant pick and short section of press or vasculum strapped to our packs.

Putting specimens into press required that each be identified as closely as possible and put into a numbered newspaper sheet. These numbers were recorded consecutively in a notebook with the name and such pertinent data as where and when it was collected. Plant presses are devices to keep herbarium specimens as flat as possible while they dry in preparation for mounting. The plant is placed in newspaper and then between two pieces of heavy blotter paper, which in turn are sandwiched between sheets of corrugated cardboard, stacked up about chest high between two wooden frames; two straps go around the whole affair and pressure is applied to flatten the plants. Simple but effective. When we put plants in press it was Clarence's job to cinch up the straps. He would hop up a little, then come down on the press with his stomach, and the stack would shrink magically. Then the press would be ready to dry. Two-burner Coleman-type stoves were used to warm the presses. If plants remain moist while in the press they have a tendency to mold and are thus ruined. Each day, when possible, the presses were taken apart and the damp blotters replaced with dry ones. On sunny days the damp ones were then strewn around on the ground to dry. The camp stoves were an improvement over the kerosene lanterns but someone had to get up in the middle of the night to refill them with gasoline and pump them up. The straps on the presses had to be cinched up again also for the plants would be partially dry and take less space. Clarence tended the presses during the day but we students, all on stipend, had the duty at night.

A few weeks after we started, Hitchy became quite ill. He visited a doctor in Missoula, returning with a little kit of medicines, determined to recover at camp. There on the banks of Rock Creek one of the more bizarre acts of modern medicine took place. We had to give him a shot of penicillin! Maxwell volunteered, which was OK because he wasn't a botany major. The hypodermic needle and the dose were huge, and the target wasn't too small either. The equipment was warmed, if not sterilized, in a wash basin over the campfire. Hitchy, bereft of bib overalls, bent over a log to take his medicine, as it were. Maxwell, with all the dexterity of a man with ten thumbs and two left hands, eventually drove the dull needle home. A few days later, despite our tender care or because of it, Hitchy entered the hospital in Missoula. His wife Evelyn and little daughter Susan came from California to be with him.

Our field operations were then directed from Hitchy's hospital bed. It turned out to be an excellent short course in microenvironments and plant relationships as well as plant identification. He would tell us where to go, what the physical conditions would be like, the species that we were to look for and the other plants they would be growing with. We would return and report on the "numbers", or specimens we had collected, and get new directions. Our tests during that time were oral, tough and detailed, and we were all as anxious as he to have him recover.

During Hitchy's illness we were collecting in the Spanish Peaks Primitive area just

north of Yellowstone. One evening we decided to drop down for a milkshake at one of the lodges in the park where there was going to be a dance. We set up camp in a campground near the lodge. After hanging around the dance for a while we headed back to camp. It had been raining and the muddy road was so difficult to drive that it was late when we got there. We decided to pitch a tent to sleep out of the rain, and three of us piled into my two-man mountain tent. It was army surplus with an entrance and mosquito nets at each end. We tied off one end near Jimmy's and my heads, just closing the mosquito net near Dick's head at the other end. It was a real crowd, but we were very tired and soon fell asleep. An odd sound woke us, and Jimmy flashed his light down toward the open end right into the eyes of a huge grizzly bear! The bear was trying to poke its nose through the netting above Dick's head. Dick flipped over to our end and the three of us shriveled against the end of the tent. The bear sniffed in little short breaths, then blew out in a great "whoosh". Jimmy was trying frantically to untie the door to escape when the bear gave up on that end and padded around to where we were. We changed ends fast. Suddenly we heard a loud banging as two little old school teachers ran off the bear. It took us some time to get back to sleep.

When Hitchy got out of the hospital, our routine soon returned to normal. Since Evelyn and Susan were traveling with us, both the food and the level of conversation improved, and the trip ended on a very positive note.

1947

The 1947 summer field trip was the first coeducational trip after the war. Una Davies joined Hitchy and Clarence, and with six young women and nine young men there were 18 of us in all. The trip took us through the Lost River and Lemhi Ranges in Idaho, then through the Montana Rockies to some of the isolated ranges on the eastern slopes such as the Big Belt and Little Belt Ranges near White Sulphur Springs.

Vehicles were all provided by the University. The Botany Department had recently acquired a surplus army truck—a GMC six by six. It was a typical army truck, but with a plywood canopy built over the truck bed to carry all the cargo. The old International had parallel seats running along its sides for passengers, and a station wagon carried the rest.

Besides the truck, the field equipment had been upgraded in other ways. The little two-burner camp stoves were replaced by gas plates that were attached by long rubber hoses to tanks of butane. These plates could be used to heat the new surplus army field kitchens or, turned low, could dry the plant presses. No more getting up in the middle of the night to refill the stoves. Long, heavy-duty tables and benches with detachable legs replaced the card tables and folding chairs. But the changes were mostly physical; the field studies fit the pattern of previous trips, and soon the camp activities were pretty much routine.

Once, when we were near White Sulphur Springs, a forest ranger let us camp in an empty ranger station. Unknown to us all, there was a very large and very dead steer in the front yard. To bury the steer, the idea was to dig dirt from under the beast and throw it on top, and we looked like a small group of ants working on a big beetle. Finally, in desperation, we hit its bloated belly with an axe. If it was unpleasant around there before, it was impossible afterwards. Eventually the task was more or less complete and we could breathe again.

Our study and collection trips included a number of overnight hikes. The big one, though, came near the end of the trip when the class undertook an 81-mile hike in an area of Big Salmon Lake and the South Fork of the Flathead River south of Glacier National Park. The bulk of the food and other gear was packed in for the first leg of the trip by horses. We carried in our own packs. Our first camp was at Big Salmon Lake where we were supposed to stay a few days to fish and eat up some of the food, but the fish were so numerous and easy to catch that it became boring and we decided to move on. So it was necessary to carry on our backs much of the food we had planned to carry in our stomachs. One of the girls had new hiking shoes and her feet were completely covered

Breakfast the first day, 1972. **Photo: G. Pirzio-Biroli**

with blisters. When we reached the Spotted Bear Ranger Station, an old Ford trimotor plane had just landed with a load of smokejumpers, and the ranger asked if she would like to fly out, which—surprise—she would, and did. The rest of us finished the hike as we started it, on foot.

The final exam this time was along the banks of the Blackfoot River, and again there seemed to be more plants than we had ever seen before. As we headed back to Seattle we asked ourselves just what did we get out of the trip anyway? To be sure, we learned our taxonomy; we struggled through Hitchy's new and revised plant keys; we were aware of plant communities and plant relationships, but that wasn't all. I think the true value was intrinsic, as it often is in these circumstances. As a group we got along together, we relied on each other and supported each other. The trip helped us prove ourselves. Several fellows met girls on the trip whom they later married. But to me the most important part was knowing Hitchy. Academically honest, humanly sensitive, predictably unpredictable, the owner of an excellent sense of humor, he was a tireless researcher and a concerned, thoughtful friend. I had gone on another Hitchcock field trip and wouldn't trade that experience for anything.

Now, 39 years after the field trips, the recollections and impressions may seem more vivid than facts would warrant, but these distortions only emphasize the importance those experiences had for us.

I want to thank Margaret Dyar Ashworth, James Nishitani and James Martin for helping jog my memory in some of the details.

1972

Our associaton with Hitchy began when I enrolled in his two-quarter taxonomy class in fall of 1971, knowing that it would end with a two-week desert field trip, and feeling relieved to be assured that my husband, Jimmy, could come too. At the end of six months I had learned a lot about plants and about Hitchy. Early in March, on the first day after winter quarter, we gathered in the Botany Seminar Room at three o'clock in the morning — about 35 students, "alumni", staff and assorted hangers-on. Hitchy had provided a bountiful supply of cold cereal, doughnuts and coffee before the caravan of four blue UW vans and several private cars set off, led by Hitchcock and his constant companions, Clarence Muhlick and Lady, the wise, elegant English spaniel.

There was an invariable rule that Hitchcock be in the lead. When he took off down that road hellbent for leather, there was no prescribed order for following vehicles — it was merely their responsiblity to keep up with him. Furthermore, directions that seemed perfectly clear to him were sometimes opaque to his retinue. No one who has traveled often with Hitchcock would say that he has never lost a car, a student or even a whole class.

On this particular morning, we stopped briefly in Tacoma to pick up a guest, left "Grass Pants" (Grants Pass, Oregon) behind us by mid-morning, and lunched in a narrow valley shortly after crossing the California-Oregon line. Doug Henderson, Hitchy's last doctoral candidate and his teaching assistant on this trip, spotted a beautiful *Sisyrinchium* in the rocks high above our heads, our first botanical find. It was more than just a flower for Doug since this genus was his thesis subject. However, this was not botanizing time. We were traveling away from winter as fast as possible. The flora would be at its best in the south. Hitchy knew how long each leg of the journey would take, where he planned to camp and at approximately what hour.

There is an exciting progression of plant associations south from Seattle, through the Willamette Valley, the Siskiyous, and the mountains of northern California. Douglas

firs and alders give way to enormous old garry oaks, to manzanitas and digger pines. Suddenly one is out of the mountains and in the Central Valley. The late afternoon sun slants across flat fields and olive groves. Eucalyptus trees line the roadsides. And it is warm.

By the second evening we reached the Los Angeles area where we enjoyed the hospitality of Hitchy's niece and her daughter — an evening barbecue and a big breakfast, with sleeping quarters on the grass in the pretty garden with its two huge avocado trees near the back. Next morning we drove through Claremont to the Rancho Santa Ana, a botanical garden specializing in the native flora. Except for the herbarium sheets we had studied in Seattle, this was our introduction to the flowers of the Southwest.

As we headed east, the first desert flowers I remember seeing were the shrubby composite, *Encelia farinosa,* lining the highway. A familiar pattern emerged. Hitchy's vehicle would come to a brisk halt; the other cars and vans would pull in behind. And behold! An apparently barren landscape, or one seemingly dominated by one or two showy species, would become a garden of wildflowers. While Hitchy drove, his eyes constantly raked the roadsides for flora. He always said he could see it best when he was at the wheel, but the fact is that he knew these habitats so well he could anticipate the best botanizing areas.

Leaving the vehicles, the class would fan out to find as many new plants as possible. When an interesting species was discovered, Hitchy would get down on the ground, one of his experienced assistants at his side (this year it was either Doug or Jimmy Nishitani). One would have the well-worn flora, while the other examined the flower with a hand lens. Together they would go through the key until they reached agreement and a pronouncement could be made. This procedure was only for plants with numerous species. Many others were simply identified for the neophytes. In another year when the phacelias (those slender, blue, usually glandular beauties) were particularly numerous and in a seemingly never-ending succession of species and varieties, the key would be crossed and recrossed until finally Hitchy would close the book and say in disgust, "Well, just another of those damned phacelias."

Another pattern was equally familiar. If he knew that something ought to be there and he couldn't find it immediately, Hitchy would amble slowly across country, his eyes on the ground, and a whole troop of students behind. Sometimes we knew what he was looking for; more often we did not. When the treasure was found, it might be some glorious miniature a gardener would covet. But often he would fall on his knees to gather a miserable looking rare weed. I am sure that many who have taken his night class have wanted to spit at the *Floerkea* in the triangle just west of Leavenworth, Washington.

Our destination that night was Fish Creek in Anza-Borrego State Park, a botanist's paradise. The road followed the southwest shore of the Salton Sea and then turned to approach Anza-Borrego from the east. By this time we were seeing all the better known desert flowers — ocotillo, *Larrea,* sand verbena and its relatives, *Salvia,* the various species of *Dalea,* the yuccas including the

A botanizing stop in the desert, 1972.

Photo: G. Pirzio-Biroli

Joshua tree, and the spectacular century plant *(Agave)* whose rosettes bloom once at maturity with one 15-foot inflorescence and then die.

We set up camp near the ranger's home at Fish Creek: the site was not particularly attractive, but it was high on a bank — a safer place to be when the sky was overcast as it was that evening. For the first time we saw unloaded the extraordinary camp kitchen that Hitchy had assembled after World War II. Our water supply was contained in two 10-gallon milk cannisters. We used paper plates, and everyone was responsible for his own cup.

The first requirement for those who were not unloading the kitchen was to scurry around with large garbage sacks collecting trash — tin cans, bottle lids, broken glass and beer bottles, bits of paper — all these were unacceptable in a Hitchcock camping place. After a few days it became automatic to begin this procedure as soon as we arrived. The work of the camp divided itself fairly well, and Hitchcock tolerated no slackers. He himself rarely shared in the dinner preparations. Somewhat apart from the rest of the group he laid out his great bedroll — a tarp, a half-blown-up air mattress and a sleeping bag all rolled into one, with a small upholstered red cushion tucked in neatly under the rope that held it all together.

Afterward he settled down with a drink, chatting with Clarence and friends or students, fondling Lady, playing with Peter (the Schreiner's adorable two-year-old son) or identifying any plant that was brought to him. Sometime after dinner, by the light of the kerosene lanterns, he would prepare the pancake or biscuit mix for breakfast. And then, if there was no campfire or singing, he retired.

Before dawn next morning the pots and pans would begin to bang, and Hitchy would be up starting breakfast. He would soon be joined by Doug, Jimmy Nishitani and a few loyal early risers. Bit by bit, sleepy-eyed students would wander in, though occasionally stragglers remained in bed until the last minute.

Jimmy Nishitani tells with an aggrieved tone of the morning many years before when his class was a bit slower than usual. Hitchcock announced that if those trucks were not loaded by eight o'clock, there would be a quiz! They worked double time, on the stroke of eight the last doors were slammed and Hitchcock said, "Now we shall have our quiz."

Breakfast was a feast. The pancakes were made with real buttermilk. The biscuits were rolled up with a filling of cinnamon and sugar, baked in the big ovens and sliced hot. There were fried eggs — as many as one wanted — and huge quantities of bacon. Every morning.

It didn't take long for Hitchcock to have us trained to this schedule. Once trained, a true Hitchcock devotee responded automatically to the banging pans in the pre-dawn darkness. Mareen Kruckeberg and I will never forget our chagrin when we met at the camp kitchen around two AM on a night-class field trip, both having heard what we thought was Hitchcock pot-banging. Someone must have stumbled over something, but Hitchy was still cozily snoring in his bedroll.

That night at Fish Creek was interesting partly because the routine was new to us, but also because some of us disregarded the danger of a flash flood to walk up the narrow canyon through which Fish Creek would have come crashing down if there had been rain in the mountains beyond. Cliffs towered a hundred feet over our heads, and there was an air of mystery about the terrain. Many of us did not know each other very well; it was a time to become acquainted.

The next morning, Hitchcock, disappointed with the flora, decided that we would try to find the *Ceanothus* blooming in the mountains east of San Diego. It was a long trip, with botanizing stops every half hour or so. The *Ceanothus* was not in bloom, but we saw an interesting array of oaks and mistletoe, and our first sight of the beautiful *Beloperone,* that scarlet member of the acanthus family.

We had a supply stop in El Centro, in the southeast corner of California. Lydiane Kyte, in charge of the kitchen, had been making lists all day. When we went into the supermarket, groups of students were assigned to select produce, meats, various canned goods or other staples. With this system, a

surprising quantity of food could be assembled in less than half an hour.

And here Hitchy lost his first car — ours. As I look back, I realize that it must have been our fault. We had left the caravan to find a Mercury dealer for our ailing station wagon. When we were ready to leave, the four vans were no longer in view and we thought we had missed them. Fortunately, it had been clearly understood that we would camp north of El Centro on the road that led to Picacho.

As we drove, we kept looking for the blue vans or some indication that they had pulled off the road. Thirty miles later we reached the Colorado River and a magnificent view of the rugged mountains beyond — and turned back in frustration. We enjoyed our detour and our passengers but we were grateful to find Doug stationed at the road to wave us in. The caravan had just arrived. The kitchen was being unloaded. Colorful tents and bedrolls were being laid out in a wide dry wash cutting through a flat, sandy expanse. And Hitchcock had already announced, "women upstream, men downstream", his invariable instructions for seeking privacy in nature. The corollary was equally predictable as he would start out with shovel in hand, "Now what did I say? Men upstream, women downstream?"

That night was exceptional for its clear, starry sky. As we lay on our backs, one of the girls who had been a camp counsellor gave us a beautiful lesson in how to find and identify the stars and constellations.

By early afternoon next day we had reached the Papago Reservation headquarters at Topawa. Hitchcock went to meet the Tribal Council to ask for permission to camp at Baboquivari and to botanize on this fabled mountain. While we waited, we climbed the hill to the cavernous general store and wandered off to a little trading post where there was a small display of Indian crafts; but mostly we sat in the sun by the town's single gas station, chatting, keying out the few weeds the well-worn ground supported (I particularly remember a rather attractive plantain), and wondering why it was taking him so long. Three hours later we decided to investigate and discovered that Hitchcock had left long ago for Baboquivari. The red crepe paper streamers had been tied at each turn, and we drove into the camp with little trouble, all of us annoyed, but no one of us as mad as Hitchcock, who said, "Well, didn't you see me turn that corner? You should have been here hours ago!"

It was a beautiful spot, this campground that the Papago Tribe used for its ceremonial gatherings. Baboquivari rose behind us, a glowing orange-red in the setting sun. Next morning we started off, trying to match the fast pace that Hitchy set, on a trail so narrow that only a few of us could be close enough to hear his identification of the numerous plants we found. We had been told that here we would find the elusive *Nemacladus* species, so delicate that it could best be seen by the shadow its intricate branching pattern cast upon the ground. We met a student coming down, and near the top, we found another bedraggled young man — hot, hungry, tired and dispirited. He had a magnificent thistle and his lunch was at the bottom of the mountain with the friend who had gone back. So we shared with him our soggy tunafish sandwiches.

Farther up the mountain there were great cliffs and caves, open spaces, ancient trees and an elegant species of *Nolina,* another member of the Agave family. One could understand why this mountain was sacred to its people.

The next day, on the way to Arivaca, Hitchy especially wanted to find the orange *Calochortus kennedyi,* and it was gorgeous, scattered across the exact hillside where he predicted it would be.

By this time he was becoming excited, for at Arivaca we would be met by Pat and Noel Holmgren, from the New York Botanical Garden, and Rich and Marie Spellenberg, from New Mexico State University at Las Cruces, with their wonderful little boys. Pat and Rich had been among Hitchy's favorite students. Another of them, Nan Bowers, had joined us with her husband several days before, as had Louisa Norris and one of her sons. Later the Putnams would spend a few days with us in the mountains near Tucson.

Arivaca was a gentle place near a small

Our last night on the road, northern California, 1972: propane-fueled oven at lower left; Clarence surveying the operation.
Photo: G. Pirzio-Biroli

river, unpolluted enough so that we could all have baths, the first in a week. Women upstream, men downstream as usual. There was a huge oak for the Spellenberg boys to climb. The conversation was nostalgic.

Next morning after breakfast had been cleared, we set off on our usual tour of the neighboring brush looking for new plants. Here I remember seeing catclaw *(Acacia greggii)* for the first time; it is well named. And here I remember Rich crawling around looking for an *Aristolochia* (related to our wild ginger) that he knew grew in the thicket. He found it where he predicted it would be, to Hitchy's immense pleasure.

This Saturday was to be a day off. Those who wanted to (and that was most of us) drove to Nogales, the Mexican border town about 30 miles away. We drove through low brown hills with scattered junipers, then descended to a small stream whose borders were massed with *Mimulus guttatus,* a plant we have in moist places of the Northwest, although this was the first time I remember seeing it.

I won't recount in detail the next two days, for they were strictly our own. We broke an axle on the way back to Arivaca; the blue vans went ahead to call a tow truck from Tucson almost 50 miles away, and one of them returned with Pat Holmgren to announce that it was coming and would we like the eskimo pies they had brought us? On Sunday we crisscrossed the area southeast of Tucson, looking for the vans. Hitchy had hurriedly explained where they would be, but the marked map had been locked up with the car until it could be repaired on Monday. At one time, near Patagonia we found some red plastic surveyor's tape, and rejected it on the basis that "this wasn't Hitchy's style" (in our ignorance we thought it had to be crepe paper). If we had followed those markers, we might have spent the night with them in Patagonia, a famous bird sanctuary. And I might have had the pleasure of a quiz—a terrible one from all reports. Hitchcock tyrannically but wisely had withheld our grades until our return on the theory that, with quizzes and a final exam hanging over our heads, we might learn more.

Late Monday morning we reclaimed our car and set off rather hopelessly in search of the caravan. We found them at a crossroads with Hitchcock fuming in the phone booth, trying to track us down. There were joyous hugs from the motley crew whose baths were now several days behind them. I have never seen a more comforting sight than those four blue vans lined up at the gas pumps. So strong was the impression they made on us that for months after the trip was over, Jimmy complained that every time he saw a blue van he automatically fell in behind it.

We headed toward another favorite Hitchcock camping place, a beautiful open canyon high in the Santa Rita mountains south of Tucson, clean and bare, with enormous trees and a sunny, flowery hillside

nearby. The plant I remember best that day was the exotic root parasite *Krameria,* but until dark Hitchy was busy with the flowers we brought him for indentification—handfuls of them, and so many different species!

There had been singing at Patagonia the night before. This night there was a big bonfire and another sing led by Missy Deardorff, wearing her black hat and skillfully playing her guitar. Although Hitchcock retired early, we did have a chance to hear his favorite tale of a cherished housecat and her rakish lover.

From this point, we headed north. The two scrapbooks that I still have were bulging with several hundred specimens. The flora remained moderately good until we reached northern California, when we began to return to the late winter we had left behind a week and a half before.

At no time did we ever have another camp as beautiful as the one we left south of Tucson. The next night, on the way north, we stayed in a pine woods below a highway on a steep grade, with trucks shifting gears all night long. After our visit to the Grand Canyon—a day-and-a-half detour planned for those who had never been to the Southwest—there was a public rest stop with a small, sterile campground, and then a dry wash in Nevada.

In northeastern California we stopped at a huge shopping center to buy a feast for our last night on the road—steak and strawberries for shortcake. By the time we found a place to stop south of the Oregon border, the sunny day had turned to a threatening evening. But we cheerfully hulled a dozen boxes of strawberries while Hitchy mixed his famous biscuit dough. When the berries were lush and gleaming, piled high in a big steel bowl, Hitchcock ordered infuriatingly, "Now, mash 'em!"

The rain began to come down fast and cold. Hitchcock insisted he was going to sleep in his bedroll outside just to set an example for these tenderfeet, but finally he was persuaded to use the back of one of the vans. Jimmy and I set up the umbrella tent that had remained unopened on top of our car, and 16 people were assigned to it. We learned later that if one person turned over, everyone else turned too. But the bonfire was enormous, and the singing continued far into the night. Next morning, the camp was blanketed in six inches of snow. Our desert trip was over.

We had one more day of driving, however, and still some botanizing of a more serious nature. Two days later Hitchy's spring taxonomy course would begin, and he needed conifer specimens for 200 students. He especially wanted the *Calocedrus* native to the area we were crossing. When eventually it was found, Hitchcock himself climbed the steep bank to gather it and called down to the rest of us, "Don't come up here unless you are immune to poison oak." A few brave souls joined him, but the sight of him standing up there with his clippers is my last memory of Hitchcock on one of the most memorable trips of my life.

Hitchy and colleague Art Kruckeberg relaxing on Table Mountain during the 1972 night-class field trip.

Photo: G. Pirzio-Biroli

Further Nomenclatural Changes for *Leucothoe*

In the Winter 1978 issue of the *Bulletin* (Vol. 41, No. 4, p. 12) I drew attention to an article in the botanical journal *Castanea* (December 1977) by Professor Norman Melvin of Miami University, Oxford, Ohio, in which he concluded that the proper name for *Leucothoe fontanesiana* should be *L. walteri,* because of the existence of a specimen at Berlin which had been described by Willdenow in 1809 as *Andromeda walteri.*

John Ingram, of the Bailey Hortorium, Cornell University, has now refuted this view by an article in *Baileya* (September 1979)[1] in which he shows that the name *Andromeda walteri* was only a nomenclatural synonym for *A. catesbaei,* previously published by Walter in 1788. The latter in turn is a taxonomic synonym of *A. axillaris* of Lamarck (1783), which was transferred to *Leucothoe* by David Don in 1834. Therefore the proper designation for the coastal species is *L. axillaris* (Lam.) D. Don.

The name of *Leucothoe fontanesiana* (Steudel) Sleumer (1959) is consequently still valid for the hardier species from the southern Appalachian mountains, in the considered and reasoned opinion of Mr. Ingram. His article[2] includes excellent drawings of the flowers and foliage of both species, which will aid in distinguishing them. The more cylindrical corolla and pubescent stamen filaments of *L. axillaris* are noticeable. A listing of their synonyms, with publications and dates, and of the literature cited concludes the article. *B.O.M.*

A Flowering Cherry Identified

BRIAN O. MULLIGAN and J.A. WITT

In the course of Professor Brockman's article on the flowering trees to be seen on the University of Washington campus, published in the Spring, 1980 issue of this *Bulletin,* brief reference was made (on p. 26) to a planting of a kind of Japanese cherry tree between the Administration Building and the Suzzallo Library, "that have the inverted cone shape of the Kwanzan cherry, but atypical flowers for that variety".

These trees have been examined independently by both authors of this note. The flowers, which are single in form and clear pink in color, are borne in clusters of three or four in each inflorescence, held out on strong pedicels. The young unfolding leaves, which appear at the same time, are mahogany-red in color. The combination of these characters is rare in this type of Japanese cherry in conjunction with the branch habit mentioned by Professor Brockman; we therefore conclude, from descriptions in such authoritative works as Collingwood Ingram's *Ornamental Cherries* (1948), and W.J. Bean's *Trees and Shrubs Hardy in the British Isles,* 8th ed., vol. III (1976), plus the colored illustration in Miyoshi's *Japanische Bergkirchen* (1916) to which Mr. Ingram makes reference and which is in the Arboretum library, that these trees are the form 'Hisakura' of *Prunus serrulata.*

It is also interesting to find that this kind has been growing in the Arboretum collection since 1940, when it was acquired from the W.B. Clarke Nursery of San Jose, California, but under another name. It was identified for us by Mr. W.H. Warren, then Director of Parks for the City of Victoria, BC, a student and collector of these most ornamental trees. He also mentioned it in an article which he wrote for the Spring, 1953 issue of our *Bulletin* (Vol. 16, No. 1), which was primarily devoted to the subject of Japanese cherries in various places, describing it as "a beautiful single pink type with moderately vigorous growth and a characteristic dark bark."

One further point, according to Mr. Eric Hoyte, Campus Landscape Architect, these trees were purchased as 'Kwanzan' and W.J. Bean's description of 'Hisakura' indicates that in England at least, "The name 'Hisakura' was at one time commonly but wrongly used for 'Kwanzan'." Perhaps here we are seeing this confusion turned around 180 degrees.

[1] Vol. XX, No. 4, pp. 141-145
[2] Available for use in the Arboretum library

Foliage and flowers of *Acer campestre*. **Photo: Don Normark**

More UW Campus Trees

C. FRANK BROCKMAN

In the last three issues of the Arboretum Bulletin *we have published a series of articles on trees of the University of Washington campus. The last article concerning angiosperms whose foliage and habit are more important than their flowers is begun in this issue and will be continued in alphabetical order as space permits. We remind our readers that maps may be obtained at entrances to the campus and that one was published in the Winter issue of the* Bulletin *(Vol. 42, No. 4, pp. 22-25).* *EDITOR*

Acer (Aceraceae)

The maples are characterized by having opposite leaves and producing pairs (sometimes triplets) of winged seeds, samaras. Their leaves are usually but not always simple and palmately lobed.

Acer campestre, English field maple.

Native of Europe and western Asia, this graceful tree is popular because of the small scale of its leaves. It is often grown in Europe as a hedge.

Characters: The leaves are one to four inches long with three to five lobes and with margins smooth or having few rounded teeth. Clusters of greenish-yellow flowers develop after the leaves. The samaras are widely divergent, almost forming a straight line.

Location: Acer campestre may be seen on the west side of Drama-TV and east of Denny Hall.

Acer macrophyllum, bigleaf maple.

Native to the Pacific Coast region from British Columbia to California, *Acer macrophyllum* is one of the giant trees in our area. Its leaves, the largest in the genus, turn golden-yellow in the fall.

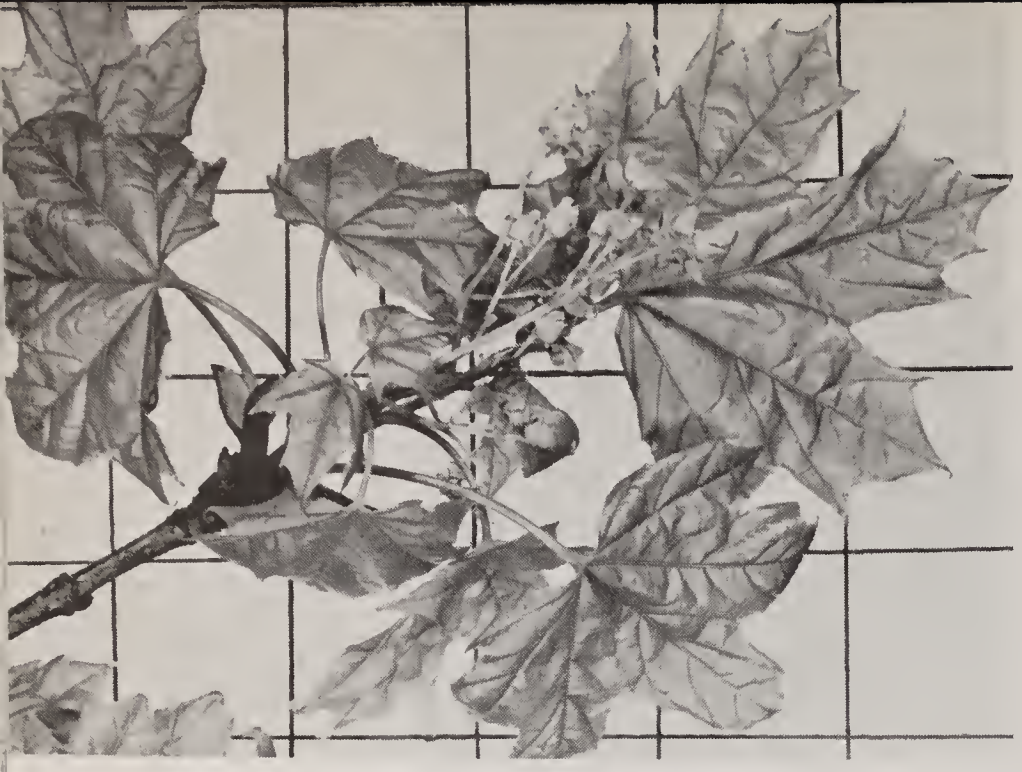
Characters: The leaves are eight to twelve inches long (occasionally larger) and have five deeply cut lobes with a few large marginal teeth. Elongate, drooping clusters of chartreuse flowers develop with the leaves. The samaras are V-shaped, and the seed cavity is brown-hairy.

Location: Bigleaf maple is native on campus. Sizable specimens may be seen in front of Denny Hall, as well as near the entrance and to the rear of Parrington Hall.

Acer negundo 'Variegatum', variegated box elder.

The compound leaves of this species and the fact that it is dioecious distinguish it from other maples. With its several varieties, box elder is native to most of the United States (excluding the West Coast) and to south central Canada.

Characters: The pinnately compound leaves are six to fifteen inches long with



Foliage and flowers of *Acer platanoides*.
Photo: C. Frank Brockman

three to seven coarsely toothed or shallowly lobed leaflets. In this variety they are marked with whitish patches and margins. The staminate flowers are clustered on long stems in the leaf axils, while the pistillate flowers are borne in drooping racemes. They appear before the leaves. The samaras are V-shaped.

Location: The one specimen on campus grows north of the Ethnic Cultural Center.

Acer platanoides, Norway maple.

This native of Europe and western Asia has many cultivars that vary in habit as well as leaf color and shape.

Characters: The typical Norway maple has leaves three to six inches long with three to five pointed lobes and large marginal teeth; the central lobe tapers from base to apex. The greenish-yellow flowers in erect, branched corymbs appear with the leaves. Petioles exude a milky fluid when broken. Samaras are widely divergent, extending almost in a straight line.

Location: Norway maple may be seen northwest of the Student Union Building and on Campus Parkway.

Acer pseudoplatanus, sycamore maple.

This species is so named because the leaves resemble those of sycamores. It is native to Europe and western Asia.

Characters: The leaves are three to seven inches long with five coarsely toothed lobes. Inconspicuous pendent clusters of greenish flowers develop after the leaves. The samaras spread at right angles.

Location: A specimen may be found between Winkenwerder and Bloedel Halls.

Acer rubrum, red maple.

Acer rubrum is another dioecious maple species. It is native to the eastern United States and southeastern Canada.

Characters: The leaves, two to six inches long, with three (occasionally five) roughly triangular, coarsely toothed lobes, turn scarlet in autumn. Clusters of reddish-yellow flowers develop before the leaves. Samaras are V-shaped.

Location: Acer rubrum may be seen along the Burke-Gilman Trail between University Way and Brooklyn Avenue.

Acer saccharinum, silver maple.

The trunk of this maple, native to the eastern United States and southeastern Canada, often separates near the ground to give it several large, upright branches.

Characters: The six- to seven-inch leaves are deeply five-lobed, with large, coarse marginal teeth, silvery on the underside. Short-stemmed clusters of small, greenish-yellow flowers develop before the leaves. The samaras are broadly V-shaped. The bark of the young trees is smooth and gray, becoming broken into elongate, shaggy scales with maturity.

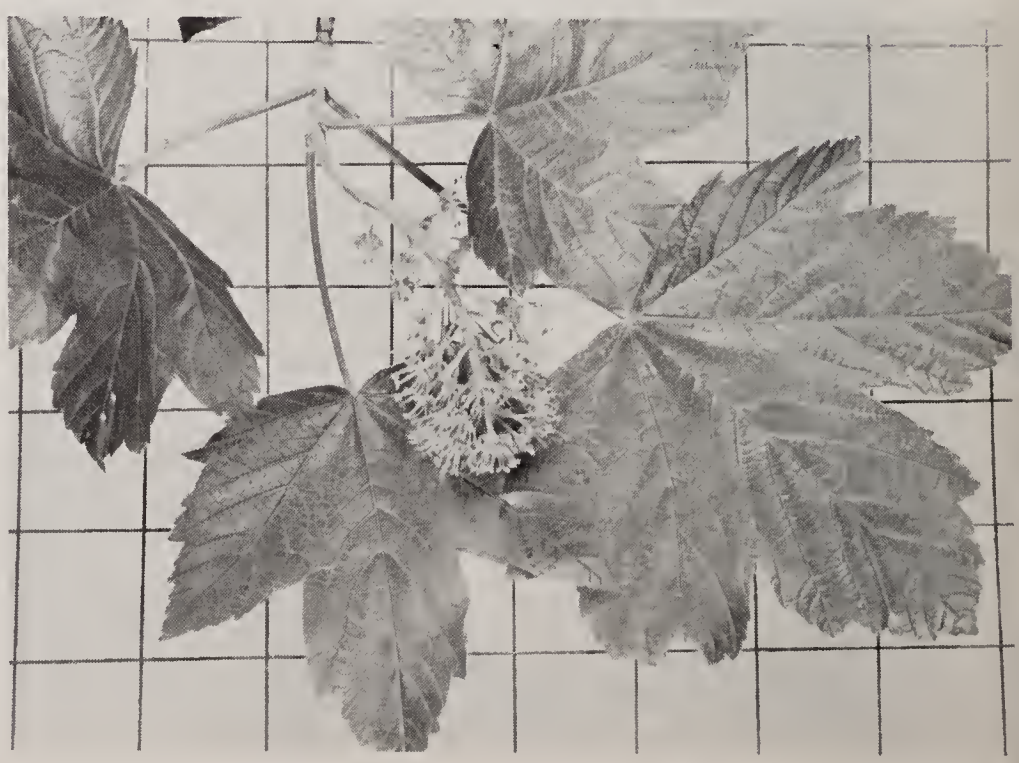
Location: The street trees on the south side of Terry-Lander Hall are young but already show the shaggy character of the bark.

Acer saccharum, sugar maple.

As the name implies, this is the source of maple sugar in the northeastern United States and southeastern Canada, where it is native.

Characters: The three- to six-inch long leaves have three to five pointed lobes with

Foliage and flowers of *Acer pseudoplatanus*.
Photo: C. Frank Brockman



large pointed marginal teeth. The sides of each lobe are roughly parallel. Clusters of small, long-stemmed, greenish-yellow flowers develop with the leaves. The samaras are U-shaped.

Location: A sugar maple grows across the walkway in front of Thomson Hall.

Ailanthus altissima, tree-of-heaven (Simaroubaceae).

This native of China thrives in poor soil, and grows so rapidly that English gardeners sometimes cut it to the ground each year and treat it as a foliage plant. It is easily reproduced by root cuttings.

Characters: The one- to three-foot leaves are odd-pinnately compound, with 11 to 15 lance-shaped leaflets three to five inches long, having smooth margins except for a few marginal teeth at the base of each one. This usually dioecious plant has pistillate and evil-smelling staminate greenish flowers in large upright clusters at the top of the tree. The reddish seeds, with their twisted wing 1½ inches long, are also borne in large clusters.

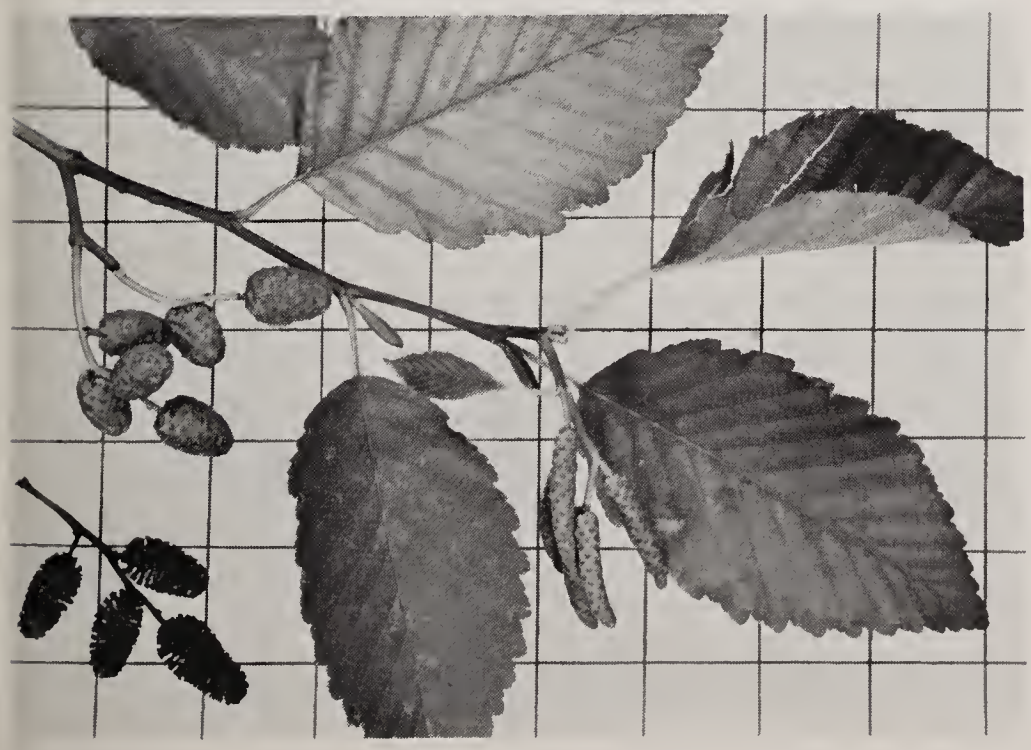
Location: Good specimens grow west of Physics Hall and between Benson and Radio-TV.

Alnus rubra, red Alder (Betulaceae).

Red alder is one of the most common trees on cutover land in the Pacific Northwest. Although it is considered a weedy tree, it is beautiful in spring when the reddish, tassel-like staminate catkins contrast with the gray bark.

Characters: The three- to six-inch leaves are elliptical, with doubly toothed margins. As in the birches, the inflorescences are

Fruits and catkins of *Alnus rubra.*
Photo: C. Frank Brockman



Staminate and pistillate aments of *Betula papyrifera.*
Photo: C. Frank Brockman

formed in the preceding fall. In the spring, the staminate catkins lengthen to about six inches, while the pistillate strobiles become cone-like and do not disintegrate, becoming black after maturity and remaining on the tree for several months.

Location: Red alder may be seen along Walla Walla Road bordering Union Bay near the Waterfront Activities Center, along the Burke-Gilman Trail near Bloedel Hall and the Plant Laboratory, and south of the NE 45th Street viaduct.

Betula (Betulaceae)

The birches are monoecious trees whose staminate catkins and pistillate, cone-like strobiles are formed the preceding fall and are a conspicuous decorative feature of the tree during the winter months, becoming enlarged in the spring. The strobiles disintegrate at maturity, releasing the winged nutlets.

Betula lenta, sweet or cherry birch.

This native of the Appalachians and southeastern Canada is one of the birches that does not have white bark.

Characters: The two- to three-inch leaves, tapering to a pointed apex from the rounded base, have singly serrate margins. The staminate catkins are pendent in the spring, whereas the strobiles remain errect. The bark is dark brown to black and non-peeling.

Location: A specimen grows near the southeast corner of parking area N2, west of Memorial Way.

Betula papyrifera, paper birch.

The paper birch has a transcontinental

distribution, with several varieties, ranging from Labrador to Alaska south into the Appalachians, the lake states and the Pacific Northwest. The variety in western Washington is var. *commutata.* This is the species from which birch-bark canoes were made by Native Americans.

Characters: Paper birch resembles *Betula lenta* in many respects except that the leaves have doubly serrate margins, the strobile is pendent, and the bark of young trees is bronze, turning white in maturity and peeling horizontally into narrow strips that curl at the ends.

Location: Specimens grow within and near the Drug Plant Garden and near the southeast corner of Thomson Hall.

Betula pendula, European white birch.

This native of Europe is the most commonly planted birch, not only on campus but in American gardens. There are several varieties including the weeping birch and the cut-leaf birch.

Characters: Although the inflorescences are similar to those of our native paper birch and the bark is white, *Betula pendula* differs from that species in several ways. The 1- to 2½-inch leaves have irregularly toothed margins and taper to a pointed apex from a flattened base; occasionally the leaf is diamond-shaped. The white bark does not peel readily, and the trunk is marked with horizontal lenticels and triangular black patches below the branches.

Location: Typical specimens occur between the Student Union Building and Smith Hall, and near the bust of Edvard Grieg, south of Thomson Hall.

Carpinus betulus 'Fastigiata', fastigiate form of the European hornbeam (Betulaceae).

This well-behaved, slow-growing tree is columnar in youth, becoming pyramidal with age. The species is native to Europe and Asia Minor.

Characters: The ovate leaves, 1½ to 3½ inches long, have a slightly lopsided rounded base and a short-pointed apex. They are slightly downy when young, becoming glabrous in fall. The male catkins are 1½ inch long. The 1½- to 3-inch pistillate catkins have three-lobed bracts facing each other beneath the flowers; these remain attached to the ribbed nutlet.

Location: A row of young trees is planted along the southeast wall of Kincaid Hall.

Carya ovata, shagbark hickory (Juglandaceae).

The hickories are well known for the toughness of their wood and for the flavor it lends to smoked meats. This species is native to the eastern United States from Maine to Florida, west to Minnesota and Nebraska, extending into southeastern Canada.

Characters: The odd-pinnately compound leaves are up to 14 inches long with five to nine leaflets, the largest of which is at the tip. The staminate flowers hang in three-branched catkins. The four-ribbed nut is enclosed in a husk that splits into four parts when ripe. This tree gets its name from the shaggy scales on its bark, though the campus specimen is too young to have acquired this feature.

Location: The single specimen on campus grows north of Denny Hall.

Castanea sativa, Spanish chestnut (Fagaceae).

Native of southern Europe, Asia minor and northern Africa, this is a true chestnut and is nearly identical to the American species *(C. dentata),* which has been ravaged by chestnut blight in the east. Although *C. sativa* is somewhat susceptible to the disease, the blight seems not to have reached the Pacific Northwest, for most of the older specimens growing here are this species rather than the American or the blight-free east Asian kinds.

Characters: The tree can reach a height of more than 100 feet with a massive trunk. The dark green, oblong-lanceolate leaves, five to eight inches long, have coarse, pointed marginal teeth. Slender unisexual and bisexual catkins develop after the leaves; the arching clusters of staminate catkins are six to eight inches long and quite prominent, while the bisexual catkins are shorter. The rounded nuts have husks with stiff, prickly, branched spines.

Location: A specimen grows southwest of Thompson Hall along the walkway between the Student Union Building and Miller Hall.

Eucalyptus spp. (Myrtaceae).

Eucalyptus is a genus typical of Australia and nearby areas. It has been widely planted in California and in other, warmer parts of the Northern Hemisphere, but only the hardier species can survive some of our colder winters.

Characters: The evergreen leaves are dimorphic. When the tree is young, its smooth-margined leaves are more or less round, opposite on the branches and usually sessile. As the tree matures, the leaves become alternate and lance-shaped. The flowers are clustered in the leaf axils on short stems. The fruit is a woody, flat-topped capsule to about one-half inch long. The bark often sheds in vertical strips.

Location: Several of the more hardy species have been planted around Anderson and Bloedel Halls.

A Revision of the Genus *Garrya*

Since the publication of two articles on *Garrya* hybrids in the Summer 1978 issue of the *Bulletin*[1], Gerald V. Dahling has published a study of this interesting, wholly New World genus in *Contributions from the Gray Herbarium* of Harvard University ("Systematics and Evolution of *Garrya*", No. 209; July 1978).

This very thoroughly researched work of 104 pages, including the bibliography, is well illustrated by 12 plates of photographs, including a number made with scanning electron microscope to show details of the leaf hairs (trichomes) and pollen grains, as well as distribution maps and several tables. The phytochemistry of the species has been closely examined, as well as their morphology and ethnobotany; the diagnostic value of the leaf pubescence is emphasized.

The author has followed Endlicher's lead of 1847, taking up again the old generic name *Fadyenia,* but using it this time as a subgenus of *Garrya.* This includes eight species ranging from the southwestern United States through Mexico to Cuba, Haiti, Jamaica, and one subspecies of the Mexican *G. laurifolia* in Guatemala, Costa Rica and Panama. The members of this subgenus are distinguished by their branching inflorescences with solitary instead of ternate flowers in the axils of the leaf-like bracts; they may become trees up to 35 or more feet in height.

Subgenus *Garrya* comprises six species distributed from southern Washington *(G. fremontii)* to Baja California *(G. veatchii),* with one remarkable outlier in the Sierra Cuchumatanes of northwestern Guatemala, at 9,000 to 11,700 feet elevation; this species *(G. corvorum)* is intermediate in certain characters between the two subgenera. Hybrids occur within both subgenera where their ranges overlap, but not between them.

Of the taxonomic changes made, five species have been reduced to subspecies: the Californian *G. congdonii* to *G. flavescens* ssp. *congdonii; G. lindheimeri* and *G. goldmanii,* from southwestern Texas into northern Mexico, to subspecies of *G. ovata; G. macrophylla* and *G. racemosa,* both Mexican natives, to subspecies of *G. laurifolia.* A variety of *G. laurifolia* from Guatemala, var. *quichensis,* has been raised to rank of subspecies. None of these is in cultivation in the Puget Sound area that I am aware of, nor are they listed in *Woody Ornamental Plants of California, Oregon, and Washington,* published by the University of California, February 1979. Perhaps more species of this genus should be introduced for trial in Pacific coast gardens. This paper by Mr. Dahling may be consulted in the University of Washington Science Library.

BRIAN O. MULLIGAN

[1]A detailed article on the *Garrya* hybrids has been prepared by Dr. E.C. Nelson of the National Botanic Gardens, Glasnevin, Dublin, Ireland and Brian Mulligan. We regret that details of this article were not finalized for inclusion in the present issue.

Book Reviews

MAGNOLIAS, by Neil G. Treseder. Faber and Faber Ltd., London, 1978. 243 pages, illustrations, maps. Price $59.95.

This comprehensive treatment of the magnolias suitable for cultivation in temperate regions is the first such book published since Millais' *Magnolias,* published in 1927, and will be of the greatest interest to magnolia enthusiasts. Major emphasis is placed on the taxonomy and nomenclature of magnolias and the book includes descriptions and illustrations of their flowers, fruits and foliage. However, there is considerable historical background on the introduction and culture of these plants and much space is devoted to their care and propagation. A study of pollination and fertilization of magnolia flowers is included as well as information on their cytology. A glossary is provided. Of particular interest is the inclusion of the "Key to Subgenera and Sections of *Magnolia"* as well as "A Revised Survey of the Genus *Magnolia* Together with *Manglietia* and *Michelia",* both by the late J.E. Dandy.

Also noteworthy are the informative appendices. Sites of important magnolia nurseries and collections are listed. The "Index of Works Cited" should greatly facilitate further study. The maps at the end of the book are of quite limited value, since no distribution patterns are shown.

Thirty-six species, subspecies and varieties of magnolias are thoroughly discussed under their respective subgeneric, sectional and individual headings. The flowers of 33 species and forms are illustrated by line drawings. The 38 magnolia hybrids and crosses known to the author at the time the manuscript was prepared are described and organized alphabetically. Eighteen additional drawings appear in this section. It might be wished that these illustrations were of higher quality. The eight pages of color plates are somewhat uneven, and the 48 photographs and painting reproductions are condensed to sizes a postcard designer might appreciate! The paintings in particular should be presented in a much larger format.

Unfortunately, certain errors have crept into this book. Of some interest to readers in the Pacific Northwest is the confusion about *Magnolia* 'Wada's Memory', a plant described in this *Bulletin.* Brian O. Mulligan's article on *Magnolia* 'Wada's Memory' is placed in an "Arnold Arboretum Bulletin, 22:20, (1959)". This should read "Arboretum Bulletin, 22:20, (1959)". The error is repeated in somewhat different fashion on page 222 in the "Index of Works Cited": Mr. Mulligan's description is referred to the "Journal of the Arnold Arboretum 22:20". To compound the confusion, the text referring to *M.* 'Wada's Memory' states that the original plant was sent to the Arnold Arboretum, not to the University of Washington Arboretum.

This book should certainly meet the requirements of the specialized audience to which it is directed; unfortunately the high price detracts substantially from its appeal to the general public and even to Magnoliaphiles! *RON BRIGHTMAN*

GREAT GARDENS OF BRITAIN, by Graham S. Thomas. Mayflower Books, Inc., New York, 1979. Published in England as *Gardens of the National Trust,* by the National Trust with Weidenfeld and Nicholson, 1979. Quarto, 292 pages, 150 black and white photographs, 32 color plates, 16 watercolors and 50 small monochrome drawings by the author. Price $19.95.

The National Trust of Great Britain, founded in 1895, is a privately funded body of concerned and interested persons. It looks after some 150 houses of various ages and a lesser number of gardens throughout the entire country, as well as owning about 400,000 acres of coastline, all for public enjoyment and their future preservation. Mr. Thomas, whose name and reputation are familiar to us through his several previous books *(Colour in the Winter Garden,* 1957; three subsequently on shrubby or climbing roses on which he is a recognised expert; and most recently his encyclopedic and invaluable *Perennial Garden Plants,* 1977), was Gardens Adviser to the Trust for 18 years from 1956 and consequently is in the best position to write this most informative account of the history and recent rehabilitation or development of many of them.

Following an appreciative "Foreword" by the late Lord Rosse, for many years chairman of the Trust's Property Committee, Part I begins with an essay on "Visiting Gardens". This is followed by an account of the National Trust, its methods and policies in dealing with gardens handed over to it, taking into consideration for each one the local factors of soil, climate and past history as well as its design and planting plans. The importance of having a capable local staff is stressed, to ensure good maintenance and care of "the biggest horticultural collection ever cared for by one organization." The generally high quality of their work was personally noted by this reviewer when visiting 10 of the Trust's properties in September and October, 1979.

Part II, "The Garden in History", describes their gradual development from the Tudor period of Henry VIII and Elizabeth I, with enclosed rectangular spaces becoming more elaborate "knot gardens" in the 17th century. Examples are cited of these and later styles as the author proceeds to the Georgian era of the 18th century when the English landscape style came into being through the designs of Bridgeman, William Kent, "Capability" Brown and Humphry Repton, with the classical example by Henry Hoare at Stourhead (1741-1765) — undoubtedly the premier surviving landscape garden of that period.

Part III, "Impressions of the Gardens", forms the most useful portion of the book for the general reader, since it contains details of 112 gardens in England, Wales and northern Ireland, whose locations are shown on a map. The notes on each garden start with situation, date and method of transfer to the Trust, and by whom, area, soil type, altitude, annual rainfall and mean January temperature. Often information is given about the house and always much more about the garden, although this naturally varies with size and hor-

ticultural importance. Large and well-known gardens such as Bodnant, Cliveden, Hidcote Manor, Knightshayes Court, Nymans and Wakehurst Place obviously deserve and receive much more attention than smaller places, although the latter often posses special features — either architectural, historical or horticultural — worthy of notice. For example, Charlecote Park near Stratford-on-Avon, where Will Shakespeare was caught poaching deer in 1558, now displays a collection of plants mentioned in his plays; and Buckland Abbey near Tavistock in Devonshire, a 16th century house once owned by Sir Francis Drake, possesses an herb garden and many tender or rare shrubs and trees. The author's small but charming pencil drawings are frequently used to illustrate particular features in such places. Eight other drawings, about full size, showing some special plants seen in certain of these gardens (four are of roses), are included at the end of this part.

Part IV, "Features of Garden Design", discusses and illustrates: "Avenues and Trees"; "Boundaries and Barriers" — walls, hedges, fences, the haha and water; "Stone in Gardens" —grottoes, rockeries and natural rock outcroppings.

The work concludes with a tabulated four-page list of "specialities" found in each of these gardens, including architectural features as well as plants; next a list of plants found at or produced in National Trust gardens, headed by Bodnant with 46 rhododendrons and 11 other plants; a useful bibliography especially concerned with the development and practice of landscape and garden design in Great Britain; finally, two very full indices — the first of Latin and English names of the plants mentioned, combined, requiring eight pages, then a shorter general index of subjects, persons and places.

This is indeed a handsomely produced and horticulturally valuable work, as one would expect from the long and practical experience of this talented author; he is also responsible for about 90 of the 150 black-and-white photographs (which he dates), for 27 of the 32 high quality color photographs, and for all the 16 watercolors of plants raised in these gardens. Any one of the latter could well qualify for the internationally famous "Botanical Magazine". It is a pity that one of his full-page color photos was not used for the frontispiece, instead of the rather dull monochrome of a group of primulas at Rowallane. For all this information and the numerous illustrations of all kinds packed into less than 300 pages, both author and publishers are to be highly congratulated and commended, while anyone interested in these varied and often historical gardens in the British Isles should obtain a copy while it is still available. *BRIAN O. MULLIGAN*

Announcements from the Unit Council

New officers for the coming year are:

1st Vice-Chairman, Membership,
Vera Frazier
3rd Vice-Chairman, Greenhouse,
Darcie Halloran
Finance Chairman, Karole Kiefer
Secretary, Sharon Goedecke
Asst. Secretary, Chris Anderson

The Education Committee will sponsor another series of cutting parties this summer for those who wish to learn plant propagation, and for experienced gardeners who want to expand their collections. They will be held on the following mornings at 10 AM:

July 10—Pat Calvert Greenhouse
Choice cuttings from the Arboretum.
Limit 10.
July 16—Mae Granston, Woodinville
Rhododendrons and azaleas. Limit 12.
July 24—Myrtle DeFriel, Medina
Treasures from Myrtle's garden.
Limit 12.
August 4—Jolly Wolter, Mercer Island
Select material from this waterfront garden. Limit 10.
August 20—Ruby Williams, Renton
Camellias, rhododendrons, daphne and much more. Limit 10.

Flats with cutting medium, labels, rooting hormone, etc. will be supplied. Please list first and second choices and include a check for $4.00, payable to the Arboretum Foundation and labeled "Cutting Class". You will be contacted about your choice as soon as possible. Mail to: Margaret MacLeran, 4708—154th Place S.E., Bellevue, WA 98006 (Phone: 747-1899).

Bring a "brown bag" lunch. Coffee or tea will be provided.

The Unit Council has published a third edition of *Cuttings Through the Year*. This invaluable manual of propagation has been updated by Joy Spurr with a new section on grafting. Price: $3.00 (plus 59 cents for postage and handling). *MOLLY WOLFE*

University of Washington Classes

Spectrum, the quarterly journal for Continuing Education, is sent free to those who have indicated interest in the Unlversity of Washington's night courses, adult education classes, concerts and other programs. Those who wish to obtain early notice of such classes and reglstratlon forms are urged to place their names on the mailing list by calling 543-2590.

Continuing Education

AMERICAN WRITERS ON NATURE. This course will read *Moby Dick, Walden,* Dlckinson's poems, and *The Sea Around Us,* and discuss their varied ideas of man as serene partner, victim or arrogant master of nature. Instructor: Katherine LaGuardia, MA, English. Tuesdays, June 24-August 12; 7:30-9:30 PM; 8 sessions, $30; parking $4.40.

HERBS: THEIR CULTIVATION, HISTORY AND USES. Herbs have long played a significant role in many societies, including our own. This course wlll cover how to grow, harvest and use a wide varlety of herbs. Through lectures, slides, live plants to touch and smell, and several field walks in the campus Pharmaceutical Drug Garden, students will also discover the historlcal and contemporary uses of herbs for medlcine, garden ornamentals, seasonlngs, dyes, cosmetlcs and potpourris. Instructor: Pat Penfleld, MA; naturalist. Mondays, June 23-July 28; 7-9:30 PM; 6 sessions, $27; parklng $3.30.

EXPLORING SEATTLE IV. This popular series consists of six evening-long field trips by bus, whlch leaves from campus and serves as a "lecture hall" en route. Students will examine our clty's varied envlronments—the working waterfronts, the downtown highrise explosion, shorellnes, tree llfe, and the impact of escalating energy costs—and will consider ways in which our environment is (and might be) managed. Some of the locations to be visited include the University of Washington campus, the waterfront, and the Edmonds shoreline. Coordinator: Polly Dyer, Publlc Servlce/Continulng Education Coordinator, UW Institute for Environmental Studies. Wednesdays, June 25-July 30; 7-9:45 PM; 6 sessions, $44 (bus transportation included); parklng $3.30.

SEATTLE'S PARKS: AN APPRECIATION. Our parks—a major source of enjoyment, pride and pleasure to everyone in Seattle. The quality of our park spaces and the actlvities they enhance are an Important part of our cultural life. As pressures Increase for urban development, what wlll happen to these open green spaces? This lecture series explores the history of our parks, new concepts of uslng open space, and important management and policy issues for Seattle's parks. The lectures are designed to help the student to learn more about our city's open spaces and to explore some optlons for the future. Coordinators: David Streatfield, Associate Professor, Landscape Archltecture, and Margaret Maxwell, Art History Graduate Program. Thursdays, June 26-August 21 (No class July 3); 7:30-9:30 PM; 8 sesslons, $22; parking $4.40.

WILDFLOWERS OF MT. RAINIER: ALPINE PLANT ECOLOGY. Wildflowers, trees and other plants of Mount Rainier have intricate ecological relationshlps wlth each other, anlmals and the mountaln environment. In a Friday evening lecture with slides, a day hlke on Saturday and a morning walk on Sunday you wlll learn about the plant ecology of Mt. Ralnler's subalpine meadows and forests at the peak of the blooming season and about the 1949 Kautz mudflow. Comfortable accomodatlons and hearty meals will be provided. Instructors: Virginia Dale Adams, PhD, Ecology, and A.B. Adams, MS, Botany. Friday 8 PM to Sunday noon; August 22-24. Course fee of $85 covers tultlon, dormltory-style lodglng (bring sleeplng bag) Friday and Saturday, and meals all day Saturday and Sunday breakfast. Refund deadline August 15. Complete program details sent with the registration confirmation. Transportation provided from the Lodge to trailheads.

New Members of the Arboretum Foundation

We are pleased to welcome the following new members (December 1, 1979 through February 29, 1980): *Family*—Mrs. June McCarthy, Mr. & Mrs. Don McCune, Mrs. Joseph Milligan, Amy & Frederick Stark, Mr. & Mrs. Thornton Thomas. *Annual* — Mrs. Ellzabeth J. Bryer, Lois Chapman, Edward Chase, Dorothy E. Chumlea, Douglas Clark, Mrs. Frank Cole, Christopher Duffy, Karen Easley, Janice Eilers, Mrs. Barbara Erling, George Fahnestock, Mrs. Frederick Farmer, Mrs. Warren Fordyce, Greenest Thumbs Garden Club, Mrs. Charlene W. Harris, Mabel Harstad, Mrs. R.J. Holtschlag, D. Douglas Krlstjanson, Mrs. Sharon Latham, Daphne Bettle Lewis, Janet Murray, Dr. M. Jane Mutti, Mrs. Henry Oberson, Mrs. Ray Olsen, Allan Orr, Mary L. Reslock, Mrs. Betty J. Rubln, Mrs. Jan L. Schneider, Nancy Davidson Short, Susan Spurkland, Jenny L. Thomas, Gerald Tornow, Mrs. Robert Walker, Mary Katherlne Wallentine, Cheryl Whiteside.

We are also grateful to the following who have increased their dues to: *Supportlng* — Mrs. F.D. Kitchell. *Contrlbuting* — Mrs. Frank Molltor. *Sustaining* — Beverly Hall.

CALENDAR OF EVENTS

Arboretum Foundation		Most study groups meet irregularly during summer. For regular times the reader is referred to previous issues of the *Bulletin*.
Board of Directors	September 11	
Unit Council		
Governing Board	September 4	For summer Explorers' Walks see Back Cover.
Quarterly Meeting	September 18	

MANY FACES OF THE ARBORETUM: exhibit at Louise Matzke Gallery, July 8-31 (see page 5).

UNIT COUNCIL SUMMER CUTTING PARTIES (see page 41).

10th ANNUAL ARBORETUM FOUNDATION FALL BULB SALE:
October 1 & 2 — Arboretum Office Parking Lot.

NOHS FALL PLANT SALE: October 3 & 4, Museum of History & Industry.

NEW ZEALAND HORTICULTURAL TOUR: October 17-November 8.

FOR ADDITIONAL INFORMATION CALL 325-4510

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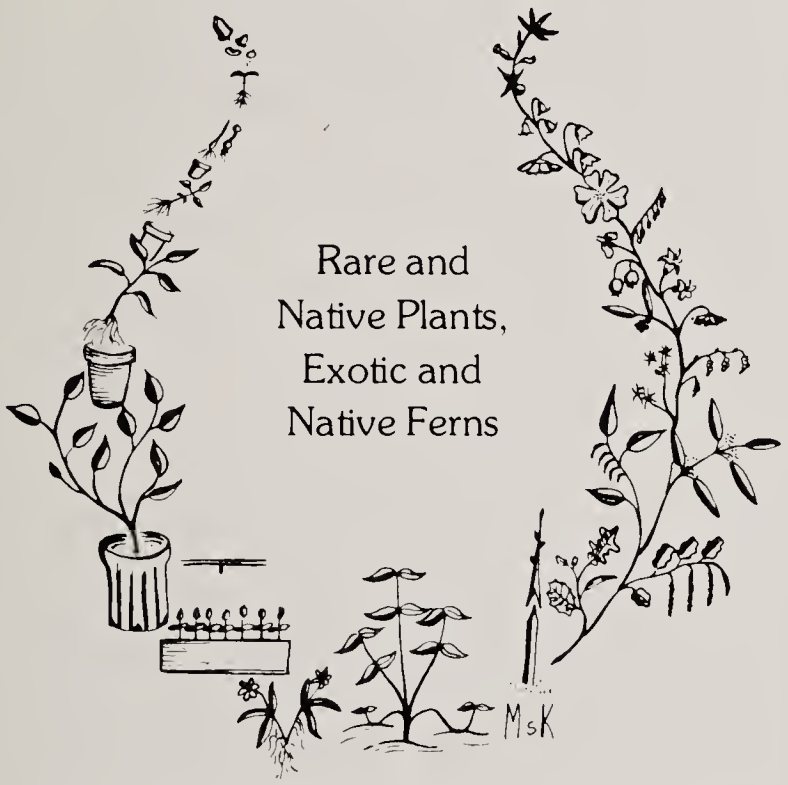

Arboretum Units, Garden Clubs and small groups are welcome to tour the Garden and Nursery.

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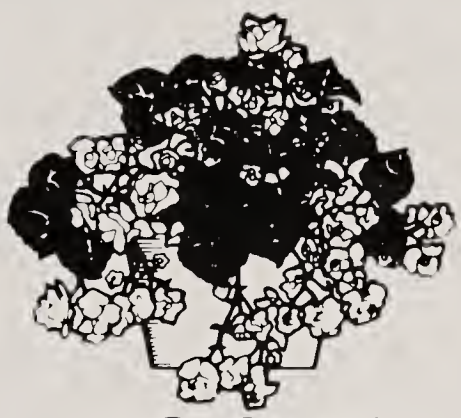

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***Rosa* "Polyantha Grandiflora" blooming in mid-July. See Brian Mulligan's article on wild roses. Photo: Brian Mulligan**

VISIT YOUR ARBORETUM IN SUMMER

Rosa "Polyantha Grandiflora" is one of the latest to bloom.

Others produce their fruits in August.

Enjoy the subtle colors of the Japanese maples in the Woodland Garden, and visit the Japanese Garden where the new Tea House is being built, thanks to your contributions.

Join the Explorers' Walks meeting at 10 AM the fourth Wednesday of each month in the Administration Building Parking Lot: June 25, July 23, August 27, September 24 and October 22.